Received
5-24-2011
WUTMB

Original

Project Manual

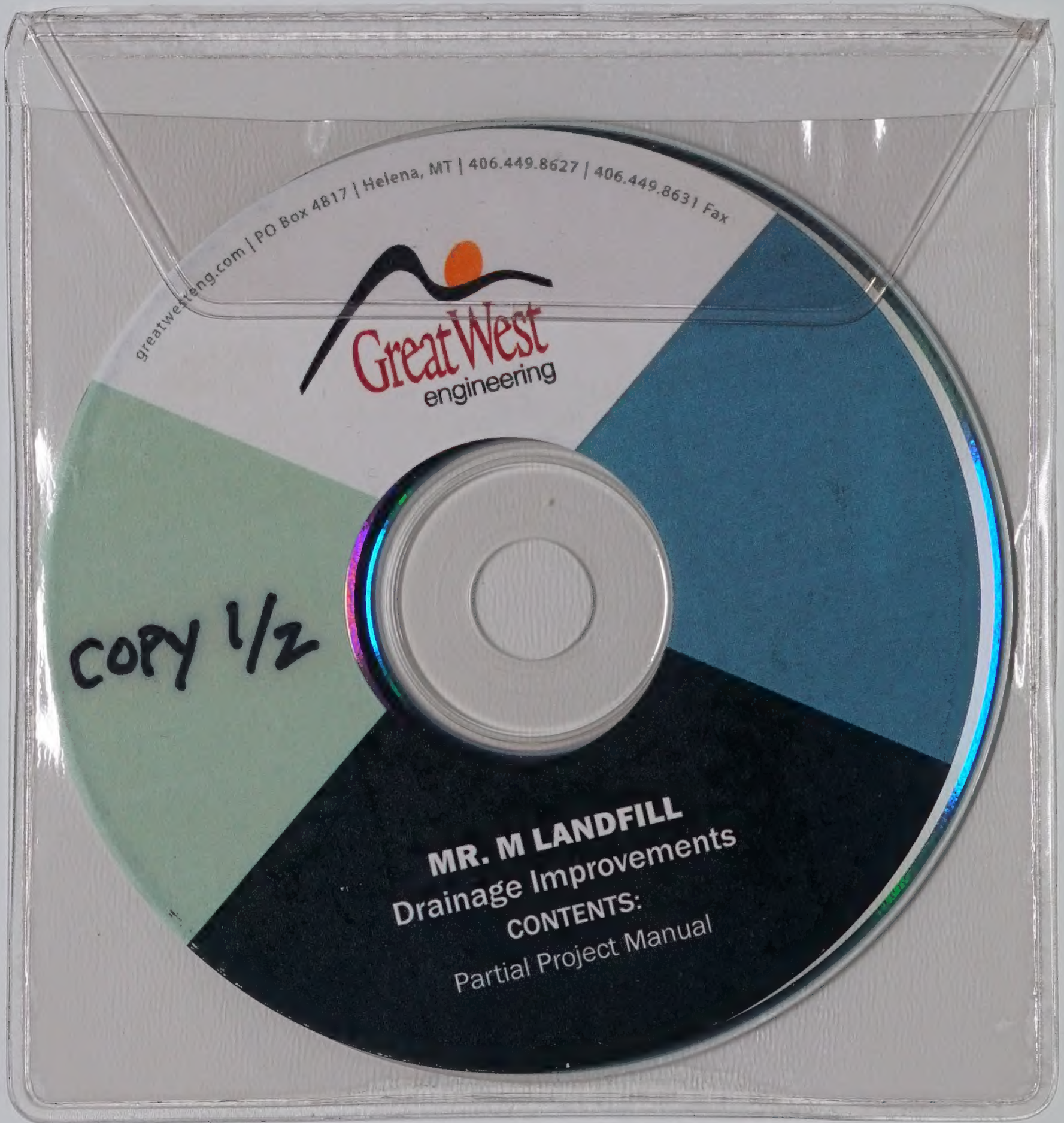
Mr. M Landfill-Lewistown, Montana
Stormwater Improvements

May 2011

Prepared by:

GreatWest engineering

Set No.: Draft


greatwesteng.com | PO Box 4817 | Helena, MT | 406.449.8627 | 406.449.8631 Fax
GreatWest
engineering
COPY 1/2
MR. M LANDFILL
Drainage Improvements
CONTENTS:
Partial Project Manual

SECTION 00300

BID FORM

PROJECT IDENTIFICATION:

Mr. M Landfill Stormwater Improvements
(Name of Project)

Lewistown, Montana
(Location)

(If applicable, Project or portion of Project for which Bid is submitted)

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Montana DEQ Solid Waste Program
(Organization)

PO Box 200901
(Street; PO Box)

Helena	MT	59620-0901
(City)	(State)	(Zip Code)

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform and furnish all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty (60) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

RECEIVED
MAY 24 2011
DEPT. OF ENVIRO. QUALITY
WASTE & UNDERGROUND TANK
MANAGEMENT BUREAU

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in the Special Provisions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Special Provisions as containing reliable "technical data."

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

1. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:"corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

4.02 The Bidder certifies that no official of the Owner, Engineer, or any member of such official's immediate family has direct or indirect interest in the pecuniary profits or Contracts of the Bidder.

4.03 Bidder represents that he has reviewed applicable State and federal laws, Civil Rights and tax requirements and will comply.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

MR M LANDFILL
STORMWATER IMPROVEMENTS
BID SHEETS

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	Mobilization	1	LS	$	$
2	24" CMP Culvert	200	LF	$	$
3	Cut, Plug, and Abandon Existing Culvert	1	EA	$	$
4	Earthwork	1	LS	$	$
5	Rip Rap	1	LS	$	$
6	Seed and Fertilize	1	LS	$	$

TOTAL Bid Price (Base Bid) **$** _____
(Figures)

TOTAL Estimated Base Bid Price **$** _____
(Words)

A. Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

B. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

C. The undersigned agrees that the unit prices shall govern in checking the Bid, and should a discrepancy exist in the Total Estimated Price and Total Amount of Unit Prices Bid as listed above after extensions are checked and corrections made, if any, the Total Amount of Unit Prices Bid as corrected shall be used in awarding this Contract.

D. The Owner reserves the right to reject any or all bids.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages and payments to Owner for additional Engineering services.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security in the amount of 10% of the maximum Bid price including alternates, if any, and in the form of a Bid Bond identified in the Instructions to Bidders;

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest: _____

Date of Qualification to do business in Montana is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address: _____

_____

Phone No.: _____

Fax No.: _____

E-mail: _____

SUBMITTED on _____, 20___

State Contractor License No.: _____ *[If applicable]*

END OF SECTION

SECTION 00910

SPECIAL PROVISIONS

SP-01	INCORPORATION OF THE MPWSS	1
SP-02	QUALIFICATIONS OF CONTRACTOR, SUBCONTRACTORS, SUPPLIERS, AND OTHERS	1
SP-03	PREBID EXPLORATION/SITE INFORMATION	2
SP-04	BEST MANAGEMENT PRACTICES	2
SP-05	WATER FOR CONSTRUCTION	3
SP-06	PRIVATE ACCESS	4
SP-07	REMOVAL AND REPLACEMENT OF FENCES, SIGNS, SIDEWALKS, CURBS, GUTTERS, POSTS, BARRICADES, ETC.	4
SP-08	CONFLICTS WITH UTILITIES	4
SP-09	DEWATERING	5
SP-10	TESTING	5
SP-11	CONSTRUCTION STAKING	6
SP-12	SOLID WASTE ENCOUNTER	7
SP-13	TRAFFIC CONTROL	7
SP-14	UNSCHEDULED EMPLOYMENT OF THE ENGINEER	7
SP-15	CONTRACTOR EMERGENCY CONTACT	8
SP-16	NOXIOUS WEEDS	8
SP-17	SEEDING	9
SP-18	CUT, PLUG AND ABANDON EXISTING CULVERT	9
SP-19	PERMITS	9

SP-01 INCORPORATION OF THE MPWSS

All provisions of the Montana Public Works Standard Specifications, Fifth Edition, March 2003 and 2006 Addendum, hereafter collectively referred to as the MPWSS, apply to the project, except where portions of the MPWSS are modified or replaced by the Contract Documents. Each Section of the MPWSS that has been modified is listed in the Table of Contents of Section 00950 Standard Modifications to MPWSS. The entire Section from the MPWS has not been rewritten for these modifications. Instead, modifications are indicted for a specific subsection, paragraph, sentence or drawing.

Section 00950 Standard Modifications to MPWSS. The entire Section from the MPWS has not been rewritten for these modifications. Instead, modifications are indicted for a specific subsection, paragraph, sentence or drawing.

Where a Standard Modification to MPWSS does not exist for a particular Section of MPWSS it shall be assumed the work is to be completed in accordance with the appropriate MPWSS Section. When a Standard Modification to MPWSS does exist the requirements of that modification supersede the related MPWSS requirement. Where paragraphs are specifically deleted or modified, or new paragraphs added, all other parts of the MPWSS will remain in effect unless otherwise modified by the Project Manual in accordance with the order of governance as specified in "Summary of Work". Forms included in the Project Manual will be used in lieu of similarly titled forms in the MPWSS. Where Technical Specifications follow the Modifications in later Divisions of the Project Manual, those Specifications replace same numbered specifications in the MPWSS.

Delete Part 4: MEASUREMENT AND PAYMENT in all sections of the MPWSS. Payment for an item will only be made if that item is listed as a Bid Item in Section 00300: Bid Form. If an item is listed as a Bid Item, administrative and procedural requirements will be listed in Section 01275: Measurement and Payment. If an item is not listed as a Bid Item, the item is not required or is considered an incidental cost to other Bid Items.

SP-02 QUALIFICATIONS OF CONTRACTOR, SUBCONTRACTORS, SUPPLIERS, AND OTHERS

Provide qualifications for the Contractor and all Subcontractors, Suppliers, or other persons or organizations identified in Technical Specifications per the guidelines in the respective specification sections.

Per Article 3.1 of the Instructions to Bidders, within five (5) days of the Owner's or Engineer's request, submit the evidence of qualifications listed in the referenced article as well as the following additional information.

- A list of at least three (3) jobs successfully completed within the last five (5) years by the Bidder similar in size and scope to the Work, including references for each project;
- The proposed Superintendent's name and resume; and
- The general availability of the Bidder to complete the Work within a reasonable timeframe.
- A list of at least five (5) bridge projects successfully completed within the last ten (10) years by the Bidder similar in size and scope to the Work, including references for each project.

In accordance with Article 6.06 of the General Conditions and Supplementary Conditions to the General Conditions, provide a list of all Subcontractors, Suppliers, or other persons or organizations providing Work or items of equipment exceeding $5,000 within five (5) days of the Owner's or Engineer's request. For each Subcontractor, Supplier, or other person or organization, include on the list the primary contact and phone number, approximate anticipated monetary value of Work, and a list of similar projects over the past three (3) years.

SP-03 PREBID EXPLORATION/SITE INFORMATION

All Bidders are strongly encouraged to visit the site of the work and conduct all field investigations at their disposal to become acquainted with the nature of the work. Obtain written authorization from the Owner utilities, and others who may be directly affected prior to entering the property, conducting field tests, drilling, boring, excavating, or test pumping.

If potential Bidders wish to excavate test pits, the excavations will be limited to the vicinity of those areas that appear on the Drawings to be excavated. Excavations in paved areas will not be allowed without written permission from the Owner. Excavations must be backfilled in a reasonably uniform manner and graded to the original ground surface line and grade. Backfill in unpaved streets, parking areas, or alleys must be compacted as specified in the Contract Documents and surfaced with four inches of new or existing gravel.

SP-04 BEST MANAGEMENT PRACTICES

Dust Control – Dust control is to be considered an integral part of the Work. Dust Control shall be provided from the start of construction until the Work is complete. Fugitive dust as a result of construction shall be controlled at all times within the subject property. The Contractor shall have a water truck available for dust control prior to beginning any construction tasks. Wetting shall be done a minimum of twice per day in dry conditions or at the direction of the Engineer or Owner as required until the final construction activities are completed. Contractor shall be prepared to provide dust control until the final surface restoration is completed. All costs incurred to meet dust control requirements are incidental to other items of the contract and no separate payment shall be made.

Erosion Control Measures – Temporary erosion and sediment control measures includes the installation and maintenance of temporary structural control measures to reduce or eliminate the erosion of soil and transport of sediment offsite as result of construction activities. This may include, but not be limited to, silt fences, ditch checks, sediment basins, erosion control mats, stabilized construction entrance, temporary diversions, inlet protection, sediment traps, and slope drains. If erosion control measures are required, it shall be the responsibility of the contractor to install and maintain them throughout the construction. All costs incurred to meet erosion control requirements are incidental to other items of the contract and no separate payment shall be made.

Noxious Weed Control – Comply with the County Noxious Weed Management Act, Title 7, Chapter 22, Part 21 and all county and contract noxious weed control requirements. Determine the specific noxious weed control requirements of each county where the project is located before submitting a bid. Equipment and vehicles will be washed prior to entering the project site to remove vegetation to avoid the spread of weeds. All costs incurred to meet noxious weed control requirements are incidental to other items of the contract and no separate payment shall be made.

Failure to Provide Service – If the contractor fails to provide adequate service on the above listed items, the Owner reserves the right to contract these activities to a third party, the cost of which will be deducted from the contract amount at the time of the next pay request.

SP-05 WATER FOR CONSTRUCTION

The Contractor may obtain water for construction purposes from the City of Lewistown at the current water usage charges. All water used must be metered, recorded and this information provided to the Owner upon project completion. The water will be made available from the fire hydrants approved by the City. The Contractor may operate the fire hydrants, however any damage sustained from the usage will be the responsibility of the Contractor to repair. The Contractor is responsible for providing all required fittings, meters, hoses, backflow assemblies, valves and other appurtenances required for obtaining water for construction from the Owner.

Contractors permitted to use a hydrant need to know and understand proper hydrant operation procedures as they are the party ultimately responsible for improper hydrant connections or any other improper operation of a hydrant. The contractor is responsible to teach proper operation procedures to all employees using hydrants. This includes water truck drivers or any other employees of the company that operate hydrants for any reason.

Meter Hydrant Connection Procedures

1. Perform a safety check of the hydrant. Check the hydrant visually, and shake the hydrant with your hands to make sure it is rigid (do not use a movable hydrant – they are dangerous and serious injury to the operator may result). Check the hydrant to ensure the caps are tight.
2. Remove hydrant nozzle cap.
3. Attach metering device and hose and install brace support. All hydrant connections must include a RPZ backflow assembly or device acceptable to the Engineer at all times.
4. Open hydrant slowly. It should take more than 60 seconds to fully open to prevent surging on the water system. Open completely to shut off drip drain while hydrant is in use. Valves downstream of the hydrant shall not be used to control flow.
5. They discharge end of the hose should not be inserted under any circumstances, into a tank or container underwater or laid on the ground to make and lay in its own pool of water. There must be at all time an air gap between the end of the water hose and the container.
6. Upon filling the tank or upon completion of the permitted use, slowly close hydrant valve.
7. Remove hose
8. Replace nozzle cap and tighten securely.
9. No hydrant shall ever be left without the cap replaced and securely tightened.

The use of fire hydrants for construction water needs is a privilege, and the Owner will not tolerate abuse of this privilege. This includes illegal connections, water theft, vandalism, tampering, failing to replace caps, or damage caused by neglect.

SP-06 PRIVATE ACCESS

At all times during construction, afford property owners access to their property to the highest degree possible and open closed-off approaches as quickly as possible.

SP-07 REMOVAL AND REPLACEMENT OF FENCES, SIGNS, SIDEWALKS, CURBS, GUTTERS, POSTS, BARRICADES, ETC.

Culverts, fences, signs, decorative rocks, newspaper boxes, posts, sidewalks, curbs, gutters, propane tanks, satellite dishes, barricades, etc. may be encountered during construction that may hinder construction operations. Whether on private or public property, remove and replace these objects as necessary to conduct construction operations. Replace objects removed in as good a condition as previously existed and to the satisfaction of the Engineer.

No additional payment will be allowed the Contractor for this work. See Section 01275: Measurement and Payment and the Drawings for more information.

The Contractor shall move the semi-trailer and barrels located in the proposed alignment of the new ditch to a location out of the construction workspace and a location approved by the Engineer and Owner. The Contractor shall also remove any surface trash and place it away from the construction area, no further responsibility is required.

SP-08 CONFLICTS WITH UTILITIES

As shown on the plans, underground utilities may be in conflict with certain areas of the project. Whether on private or public property, Contractor shall relocate, remove, replace, cross, work around, support, or other as necessary to conduct construction operations and properly construct the project. Utilities and other appurtenances may include but are not limited to the following; culverts, propane lines, TV cables, telephone lines and pedestals, electrical boxes and lines, gas mains, street lights, telephone and power poles, water mains and services, sewer mains and services and storm drain pipe and inlets.

Utility locations are based on the best available information which has been provided to or discovered by the Engineer. There is no guarantee as to the accuracy and completeness thereof is expressly disclaimed.

The Contractor shall coordinate his work with all utility companies or private entities that may be affected by the project. The Contractor will also coordinate with the appropriate utility owners to relocate, remove, replace, cross, work around, support, or other as necessary to conduct construction operations and properly construct the project. The Contractor will pay for any charges associated to relocate, remove, replace, cross, work around, support, or other as necessary to conduct construction operations and properly construct the project. The Contractor shall be solely responsible for any damage to these utilities due to his operations. The Contractor shall work closely with the utilities to ensure their criteria are met and no problems result. No separate payment will be made for this work and the Contractor shall figure the cost of such work into other applicable bid items. The Contractor shall also check with the Utilities Underground Location Center (1-800-424-5555) at least 48 hours in advance so that all utilities are located prior to digging.

SP-09 DEWATERING

The Contractor will be responsible for any dewatering operations which may be necessary to adequately remove water such that construction activities can be completed as specified. The Contractor will be responsible for conveyance and disposal of water to surface watercourses. Make all necessary arrangements for infringements across private property and obtain and adhere to any necessary discharge permits from the Montana DEQ.

SP-10 TESTING

Complete testing of all components of the project will be required to the satisfaction of the Owner and the Engineer. Remedy all defects and performance problems revealed by the testing to the satisfaction of the Engineer by the Contractor at no additional expense to the Owner.

The engineer will conduct the following tests at no cost to the Contractor:

1. On-site moisture and density testing of trench backfill, embankments, engineered fill placement, crushed base course, and asphalt pavement.

Should the materials fail to meet the test specified, the Contractor will pay the costs of all retests conducted by the Engineer, or the Contractor may elect to have an approved testing laboratory conduct retests at the Contractor's expense.

The Contractor will be responsible for conducting and paying for the following tests:

1. Gradations for gravels, bedding, and base materials as specified.
2. Gradations for riprap.
3. Proctors for different materials and gravels used for backfill.
4. Re-testing of failed tests that were conducted by the Engineer.
5. Other tests as outlined in the Technical Specifications.

All tests which are the responsibility of the Contractor must be conducted by an approved, certified testing laboratory or individual. Acceptance or rejection of materials will generally be determined from tests made in-place in the field.

The following is frequency testing table for soils and concrete:

Quality Control Frequency Table

SECTION	ITEM DESCRIPTION	TEST OR SUBMITTAL	FREQUENCY
GENERAL			
Varies	All Materials	Sieve Analysis	Every New Material
Varies	All Materials	Atterberg Limits	Every New Material
Varies	All Materials	Lab. Max Density	Every New Material
02300	Select Fill/Structural Fill	Field Density/Moisture Content	1 test / 1,000 SF / lift
GENERAL - ROADWAY			
Varies	All Materials	Sieve Analysis	Every New Material
Varies	All Materials	Atterberg Limits	Every New Material
Varies	All Materials	Lab. Max Density	Every New Material
02230	Borrow / Embankment Fill	Field Density/Moisture Content	1 test / 5,000 SF / lift
02230	Original Ground / Native Subgrade	Field Density/Moisture Content	1 test / 5,000 SF / lift
02234	Sub-Base Course(s)	Field Density/Moisture Content	1 test / 2,500 SF / lift
02235	Base Course(s)	Field Density	1 test / 2,000 SF / lift

SP-11 CONSTRUCTION STAKING

The Engineer will provide horizontal control for the project consisting of stakes along the project baseline. Vertical control will be provided by benchmarks throughout the project site. All offset staking is the Contractors responsibility. The Contractor shall protect all control points during the course of their work and replace any points damaged or removed by their activities. All survey monuments and stakes provided by the Contractor shall be subject to inspection and verification by the Engineer. The Contractor shall provide all additional staking necessary for vertical and horizontal control such that the project may be completed in accordance with the plans and specifications.

The Engineer shall provide the following staking consisting of stakes or hubs.

- Vertical Control – Vertical control will be provided by benchmarks throughout the project site.
- Piping – Horizontal control will be given at culvert termination.
- Berm – Horizontal control will consist of centerline of berm.
- Ditches – Horizontal control will consist of centerline every 50 feet as well as PCs and PTs.

SP-12 SOLID WASTE ENCOUNTER

Existing solid waste is not expected to be encountered during the excavation of the drainage ditches. However, should solid waste be encountered during excavations, the Contractor shall cease operations in that area and wait for a Change Order to be approved by all parties for the Contractor to handle the waste.

SP-13 TRAFFIC CONTROL

The Contractor shall maintain access on Boyd Creek Road during construction. The Contractor shall contact Fergus County and Montana DOT for any necessary permits. The Contractor shall be responsible to adhere to any and all necessary permit requirements for traffic control.

SP-14 UNSCHEDULED EMPLOYMENT OF THE ENGINEER

Damages for the unscheduled employment of the Engineer and/or Inspector will be assessed against the Contractor necessitated by: (1) the Contractor working beyond the specified contract time; (2) the Contractor working more than 8 hours per day, (or 40 hours per week if four ten hour shifts are run) or on Saturdays, Sundays, and Federal Holidays; (3) the Contractor utilizing material, supplies, or equipment that requires the redesign of the project; (4) the Contractor destroying or disturbing baselines benchmarks or reference stakes; (5) the failure of the Contractor to maintain acceptable as-built records, and (6) review of submittals that were returned to the Contractor requiring revision or resubmittal.

Damages for the unscheduled employment of the Engineer and/or Inspector will be determined based on the following hourly rates:

Straight Time	
Project Manager	$135.00/Hour
Project Engineer	$85.00/Hour
Resident Project Representative (RPR)	$90.00/Hour
RPR Overtime Rate	$135.00/Hour
Clerical	$48.00/Hour
Mileage	$ 0.65/Mile
Survey Crew	$160.00/Hour
GPS Rental	$400.00/Day
Nuclear Densometer	$75.00/Day

The rates listed herein are subject to changes on January 1st of each year.

Out of pocket expenses for materials, equipment, supplies, transportation, and subsistence will be billed at cost plus ten percent. Damages for unscheduled employment of the Engineer and/or Inspector will be deducted from monthly progress payments and the final payment as the damages are incurred. Damages for unscheduled employment of the Engineer are independent from liquidated damages for delay as described in the agreement.

SP-15 CONTRACTOR EMERGENCY CONTACT

Provide a primary and secondary 24-hour, 7-day a week emergency contact.

SP-16 NOXIOUS WEEDS

Comply with the County Noxious Weed Management Act, Title 7, Chapter 22, Part 21 and all county and contract noxious weed control requirements. Determine the specific noxious weed control requirements of each county where the project is located before submitting a bid. Equipment and vehicles will be washed prior to entering the project site to remove vegetation to avoid the spread of weeds. All costs incurred to meet noxious weed control requirements are incidental to other items of the contract.

SP-17 SEEDING

Furnish the native grass seed mixture as seen in the table below. Alternate mixes may be used, with Engineer's approval.

Plant Species	Percent of Mixture	LBS. / Acre Needed in Mixture
Blue Bunch Wheat Grass	30%	6.0 lbs
Western Wheat Grass	30%	8.0 lbs
Green Needle Grass	20%	5.0 lbs
Slender Wheat Grass	10%	6.0 lbs
Thick Spike Weed Grass	10%	8.0 lbs
Total		**33 lbs/Acre Total**

Sow seed in the areas described in the Contract Documents at the rate of 33 pounds per acre on a "pure live seed" basis. The necessary bulk seed can be calculated by:

$$\text{Necessary Bulk Seed} = \frac{\text{Total Pounds (kg) Pure Live Seed Required}}{\text{(\% Germination) x (\% Purity)}}$$

SP-18 CUT, PLUG AND ABANDON EXISTING CULVERT

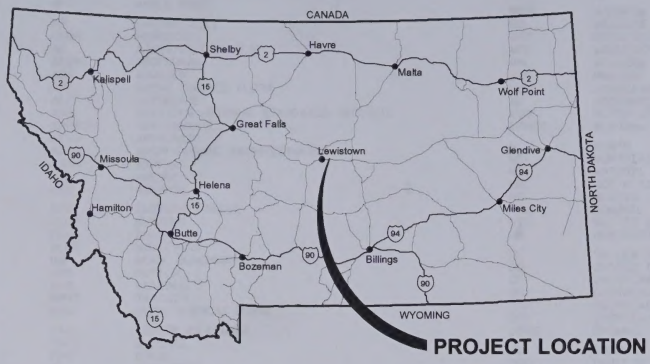
As shown on the Drawings, the culvert connecting the existing storm water ponds shall be abandoned. The Contractor shall cut the old culvert back, and either cap or plug with a fitting designed for the purpose or fill in and around the pipe end with one quarter yard of concrete.

SP-19 PERMITS

This project is expected to disturb less than 1.0 acre total of previously undisturbed ground. Therefore, the project will not require a construction stormwater discharge permit from the State of Montana. The Contractor will be required to install erosion control structures along the project boundary and any disturbed areas. The State does not allow sediment from construction to enter state waters. The Contractor will prepare and implement a stormwater control plan in accordance with state requirements to prevent sediment from entering Boyd Creek and minimize erosion on the construction sites. This plan

will be submitted to the Engineer for approval prior to beginning construction. The plan will utilize straw bales, straw wattles, silt fences, and/or other methods to control site runoff. For each day that stormwater leaves the project site without erosion control in place, the Owner will assess liquidated damages of $500 per day. The Contractor will be responsible for any potential damages or penalties assessed by the State of Montana due to any permit violations by the Contractor. No additional payment will be made for this item. The cost for this work is incidental to the contract.

END OF SECTION



MISTER
DRAINAGE I

CONSTRU

SECTION 8, TOWN

N

PLANS PREPARED FOR:

MR. RICK THOMPSON
DEQ SOLID WASTE PROGRAM

RECEIVED
MAY 24 2011
DEPT. OF ENVIRO. QUALITY
WASTE & UNDERGROUND TANK
MANAGEMENT BUREAU

APPROVED BY:

STEPHANIE M. REINIG, P.E.
GREAT WEST ENGINEERING

MONTANA STEPHANIE M. REINIG 9700PE LICENSED PROFESSIONAL ENGINEER DRAFT

QA/QC BY:

ROBERT E. CHURCH, P.E.
GREAT WEST ENGINEERING

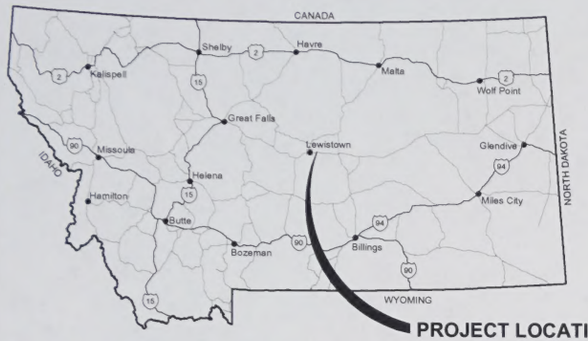
MONTANA ROBERT E. CHURCH 9707P.E. REGISTERED PROFESSIONAL ENGINEER DRAFT

PLANS PREPARED BY:

BRET ANDERSON

GreatWest engineering
2501 BELT VIEW DRIVE
HELENA, MT 59601
(406)449-8627

F:\1-10204-Mr M Landfill\CADD 1-10204\Sheets\1-10204-01-Cover.dwg



MISTER M LANDFILL DRAINAGE IMPROVEMENTS

CONSTRUCTION PLANS

SHEET INDEX	PROJECT: 1-10204
	DATE: MAY 23, 2011

SHEET 1	COVER
SHEET 2	LEGEND - ABBREVIATIONS AND GENERAL NOTES
SHEET 3	SITE PLAN
SHEET 4	POND 2 DITCH PLAN AND PROFILE
SHEET 5	DETAILS

SECTION 8, TOWNSHIP 15 N., AND RANGE 19 E.

NOT TO SCALE

PLANS PREPARED FOR:

MR. RICK THOMPSON
DEQ SOLID WASTE PROGRAM

RECEIVED
MAY 24 2011
DEPT. OF ENVIRO. QUALITY
WASTE & UNDERGROUND TANK
MANAGEMENT BUREAU

APPROVED BY:

STEPHANIE M. REINIG, P.E.
GREAT WEST ENGINEERING

MONTANA STEPHANIE M. REINIG DRAFT LICENSED PROFESSIONAL ENGINEER

QA/QC BY:

ROBERT E. CHURCH, P.E.
GREAT WEST ENGINEERING

MONTANA ROBERT E. CHURCH DRAFT REGISTERED PROFESSIONAL ENGINEER

PLANS PREPARED BY:

BRET ANDERSON

GreatWest engineering
2501 BELT VIEW DRIVE
HELENA, MT 59601
(406)449-8627

ORIGINAL

RECEIVED
MAY 24 2011
DEPT. OF ENVIRO. QUALITY
WASTE & UNDERGROUND TANK
MANAGEMENT BUREAU

NO.	REVISION DESCRIPTION	BY	DATE

SET NO.

SHEET NO. 1

F:\1-10204--Mr M Landfill\CADD 1-10204\Sheets\1-10204--01--Cover.dwg

ABBREVIATIONS

@	AT
Δ	ANGLE OF DEFLECTION, DELTA ANGLE
<PT	ANGLE POINT
AB	ANCHOR BOLT
ABDN	ABANDON
AC	ASBESTOS CONCRETE
ADDN	ADDITIONAL
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
APVD	APPROVED
ARCH	ARCHITECTURE, ARCHITECTURAL
ASPH	ASPHALT
AVE	AVENUE
AVG	AVERAGE
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BLK	BLOCK
BLVD	BOULEVARD
BM	BEAM, BENCHMARK
BOT	BOTTOM
BRG	BEARING
BRKT	BRACKET
BVC	BEGIN VERTICAL CURVE
C–C	CENTER TO CENTER
CHAN	CHANNEL
CHK	CHECK
CI	CAST IRON
CIPC	CAST–IN–PLACE CONCRETE
CIRC	CIRCULAR
CJ	CONSTRUCTION JOINT, CONTROL JOINT
℄	CENTER LINE
CLR	CLEAR, CLEARANCE
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNITS
CO	CLEANOUT
COL	COLUMN
CONC	CONCRETE
CONSTR	CONSTRUCTION
CONT	CONTINUE, CONTINUED, CONTINUOUS
CONTR	CONTRACTOR
COORD	COORDINATE
CP	CONTROL PANEL, CONTROL POINT
CPLG	COUPLING
CTR	CENTER
CTV	CABLE TELEVISION
CU	CUBIC, COPPER
CF	CUBIC FEET
CULV	CULVERT
CY	CUBIC YARD
DET	DETAIL
DI	DUCTILE IRON, DRAIN INLET
DIA, ø	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DR	DRIVE
DWG	DRAWING
E	EAST
EA	EACH
EL, ELEV	ELEVATION
ELB	ELBOW
ELEC	ELECTRIC, ELECTRICAL
ENCL	ENCLOSE
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
EQ	EQUAL, EQUALLY
EQ SP	EQUALLY SPACED
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
EVC	END VERTICAL CURVE
EW	EACH WAY
EXC	EXCAVATE
EXP	EXPANSION
EXP JT	EXPANSION JOINT
EXST	EXISTING
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDN	FOUNDATION
FES	FLARED END SECTION
FET	FLARED END TERMINAL
FF	FINISHED FLOOR
FG	FINISH GRADE
FHYD	FIRE HYDRANT
FJ	FLANGE JOINT
FL	FLOW LINE
FLEX	FLEXIBLE
FM	FORCEMAIN
FT	FOOT, FEET
FO	FIBER OPTIC
FTG	FOOTING, FITTING
G	NATURAL GAS
GA	GAGE, GAUGE
GAL	GALLON
GALV	GALVANIZED
GND	GROUND
GVL	GRAVEL
HB	HOSE BIB
HDPE	HIGH DENSITY POLYETHYLENE
HOR, HORIZ	HORIZONTAL
HWY	HIGHWAY
HYD	HYDRANT
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH
INV	INVERT
JB	JUNCTION BOX
JT	JOINT
K	RATE OF VERTICAL CURVATURE
LBS	POUNDS
LF	LINEAR FEET
LN	LANE
LPG	LIQUID PROPANE GAS
LT	LEFT
MAX	MAXIMUM
MD	MEASURE DOWN
MFD	MANUFACTURED
MFR	MANUFACTURE, MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MOV	MOTOR OPERATED VALVE
MPWSS	MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS
N	NORTH
NE	NORTHEAST
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
NW	NORTHWEST
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OVERFLOW
OH	OVERHEAD
OHP	OVERHEAD POWER
OHT	OVERHEAD TELEPHONE
OPNG	OPENING
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PE	PLAIN END, POLYETHYLENE
PERP	PERPENDICULAR
PI	POINT OF INTERSECTION
PL	PROPERTY LINE
PNL	PANEL
PRC	POINT OF REVERSE CURVATURE
PREFAB	PREFABRICATED
PRELIM	PRELIMINARY
PREP	PREPARE, PREPARATION
PROP	PROPERTY
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
R, RAD	RADIUS
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDCR	REDUCER
REBAR	REINFORCEMENT BAR
REF	REFERENCE
REINF	REINFORCE
REQD	REQUIRED
RR	RAILROAD
RST	REINFORCING STEEL
RT	RIGHT
R/W	RIGHT–OF–WAY
S	SOUTH, SANITARY SEWER
SAN	SANITARY
SCH	SCHEDULE
SD	STORM DRAIN
SDWK	SIDEWALK
SE	SOUTHEAST
SECT	SECTION
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SLP	SLOPE
SPEC	SPECIFICATION
SQ	SQUARE
SSTL	STAINLESS STEEL
STA	STATION
SS	SANITARY SEWER SERVICE
STD	STANDARD
ST	STREET
STL	STEEL
STRUCT	STRUCTURE
SW	SOUTHWEST
SYM	SYMMETRICAL
TB	THRUST BLOCK
TBC	TOP BACK OF CURB
TBM	TEMPORARY BENCH MARK
TEL	TELEPHONE
TEMP	TEMPORARY
THRU	THROUGH
TYP	TYPICAL
UG	UNDERGROUND
UGP	UNDERGROUND POWER
UGT	UNDERGROUND TELEPHONE
UTIL	UTILITY
V	VALVE, VOLT
VB	VALVE BOX
VERT	VERTICAL
VOL	VOLUME
W	WEST, WATER
WTR	WATER
WD	WOOD
W/	WITH
W/O	WITHOUT
WL	WETLAND
WM	WIRE MESH, WATER METER
WS	WATERSTOP, WATER SURFACE, WATER SERVICE
WT	WEIGHT
WV	WATER VALVE
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
XFMR	TRANSFORMER
X–ING	CROSSING
XS	CROSS SECTION
YD	YARD

LEGEND

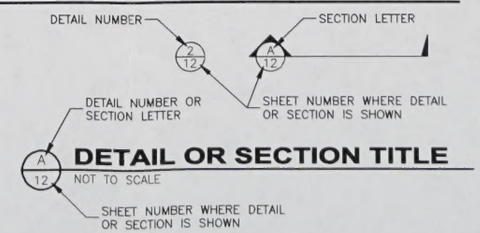
EXISTING	PROPOSED	DESCRIPTION
		MAJOR CONTOUR
		MINOR CONTOUR
OHT	OHT	OVERHEAD TELEPHONE
UGT	UGT	UNDERGROUND TELEPHONE
CTV	CTV	CABLE TELEVISION
FO	FO	FIBER OPTIC
G	G	NATURAL GAS
OHP	OHP	OVERHEAD POWER
UGP	UGP	UNDERGROUND POWER
S	S	SANITARY SEWER
SS	SS	SANITARY SEWER SERVICE
FM	FM	SANITARY SEWER FORCEMAIN
SD	SD	STORM DRAIN
		STORM CULVERT
W	W	WATER
WS	WS	WATER SERVICE
		CHAINLINK FENCE
X	X	BARBED WIRE FENCE
		WOOD FENCE
		PAVED ROAD
		GRAVEL ROAD
		PROPERTY/LOT LINE
		PROPERTY EASEMENT
		PROPERTY SETBACK
		RIGHT–OF–WAY
		CITY LIMIT/DISTRICT BOUNDARY
		RAILROAD
		DITCH
		WATER EDGE
WL		WETLAND
		BUILDING
		BENCHMARK
		CONTROL POINT
		PROPERTY PIN
		BORING
		MONITORING WELL
		TEST PIT
		BOLLARD
		MAIL BOX
		SIGN

EXISTING	PROPOSED	DESCRIPTION
		STUMP
		SHRUB/BUSH
		TREE–CONIFER
		TREE–DECIDUOUS
		TREE LINE
		COMMUNICATION MANHOLE
C	C	COMMUNICATION VAULT
T	T	TELEPHONE RISER
TV	TV	CABLE TV RISER
		NATURAL GAS METER
G	G	NATURAL GAS RISER
		NATURAL GAS VALVE
		LIGHT POLE
		STREET LIGHT POLE
P	P	POWER RISER
		PAD MOUNTED TRANSFORMER
P	P	POWER VAULT
		UTILITY POLE
		GUY WIRE
S	S	SANITARY MANHOLE
		SANITARY CLEANOUT
		SANITARY LAMPHOLE
ST	ST	STORM MANHOLE
		STORM ROUND INLET
		STORM SQUARE INLET
		STORM CATCH BASIN
		11.25° ELBOW
		22.50° ELBOW
		45° ELBOW
		90° ELBOW
		TEE
		CROSS
		CAP
		FIRE HYDRANT
		GATE VALVE
		REDUCER
		WATER METER
W	W	WELL
		CURB STOP
		FROST FREE HYDRANT

GENERAL NOTES:

1. THIS IS A STANDARD LEGEND AND ABBREVIATION LIST. THEREFORE, NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED ON THIS PROJECT.
2. UNLESS MODIFIED BY THE CONTRACT DOCUMENTS, ALL WORK WILL CONFORM TO THE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS, FIFTH EDITION, MARCH 2003 & 2006 ADDENDUM (REFERRED TO COLLECTIVELY AS MPWSS).
3. EXISTING UNDERGROUND UTILITIES SHOWN ARE FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS APPROXIMATE AND MAY BE INCOMPLETE. FOR ACCURATE LOCATION, THE CONTRACTOR SHALL CONTACT, PRIOR TO EXCAVATION, THE UTILITIES UNDERGROUND LOCATION CENTER AT: 1–800–424–5555.

GENERAL DESIGN DESIGNATIONS:



NO.	REVISION DESCRIPTION	BY	DATE

PROJECT: 1-10204
DESIGNED: SMR / BAA
DRAWN: BAA
CHECKED: REC
APPROVED: SMR
DATE: MAY 23, 2011

MONTANA REGISTERED PROFESSIONAL ENGINEER STEPHANIE M. ROOPE LICENSED 11764PE
DRAFT

GreatWest engineering
2601 BELT VIEW DRIVE
HELENA, MT 59601
(406)443-5627

MISTER M LANDFILL

DRAINAGE IMPROVEMENTS

LEGEND - ABBREVIATIONS AND GENERAL NOTES

SHEET NO.
2
OF 5

F:\1-10204-Mr. M Landfill\CADD 1-10204\Sheets\1-10204-02-General.dwg

EXISTING PROPERTY (TYP.)

PLUG AND ABANDON EXISTING 36" CULVERT

MAINTENANCE BUILDING

POND 2 DRAINAGE DITCH SEE SHEET 4

POND 1

POND 2

APPROXIMATE WASTE LIMIT

NORTH

POND 1 DRAINAGE DITCH SEE SHEET 5

OFFICE

MATCH EXISTING DITCH

RICHARDS HOUSEHOLD

MATCH EXISTING DITCH

TRAILER TO BE RELOCATED FOR CONSTRUCTION

CONSTRUCT BERM SEE (5/5)

POND 2 DRAINAGE DITCH SEE SHEET 4

VALLEY GUTTER SEE (6/5)

BOYD CREEK ROAD

REPAIR ROAD OVER CULVERTS PER (8/5)

4 – 24"ø x 50' CMP

MATCH EXISTING DITCH

U.S. HIGHWAY 87

SITE PLAN

0 75 150

SCALE IN FEET

NO.	REVISION DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			
6			

PROJECT: 1-10204
DESIGNED: SMR / BAA
DRAWN: BAA
CHECKED: REC
APPROVED: SMR
DATE: MAY 23, 2011

STEPHANIE M. ROOPE — 11765 — REGISTERED PROFESSIONAL ENGINEER — MONTANA

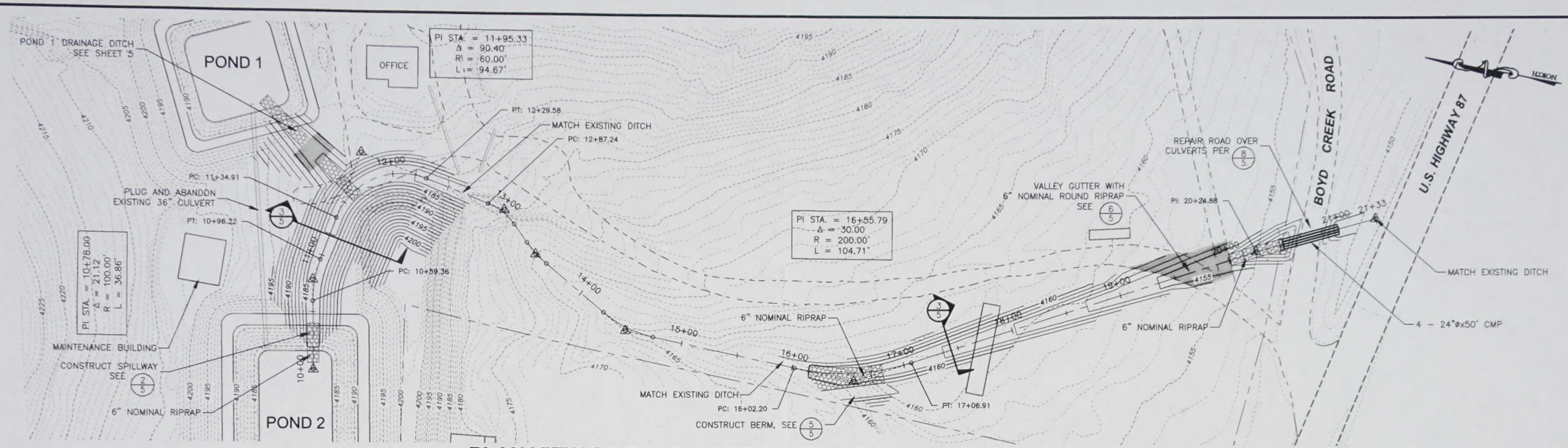
DRAFT

GreatWest engineering
2501 BELT VIEW DRIVE
HELENA, MT 59601
(406)443-0627

MISTER M LANDFILL
DRAINAGE IMPROVEMENTS
SITE PLAN

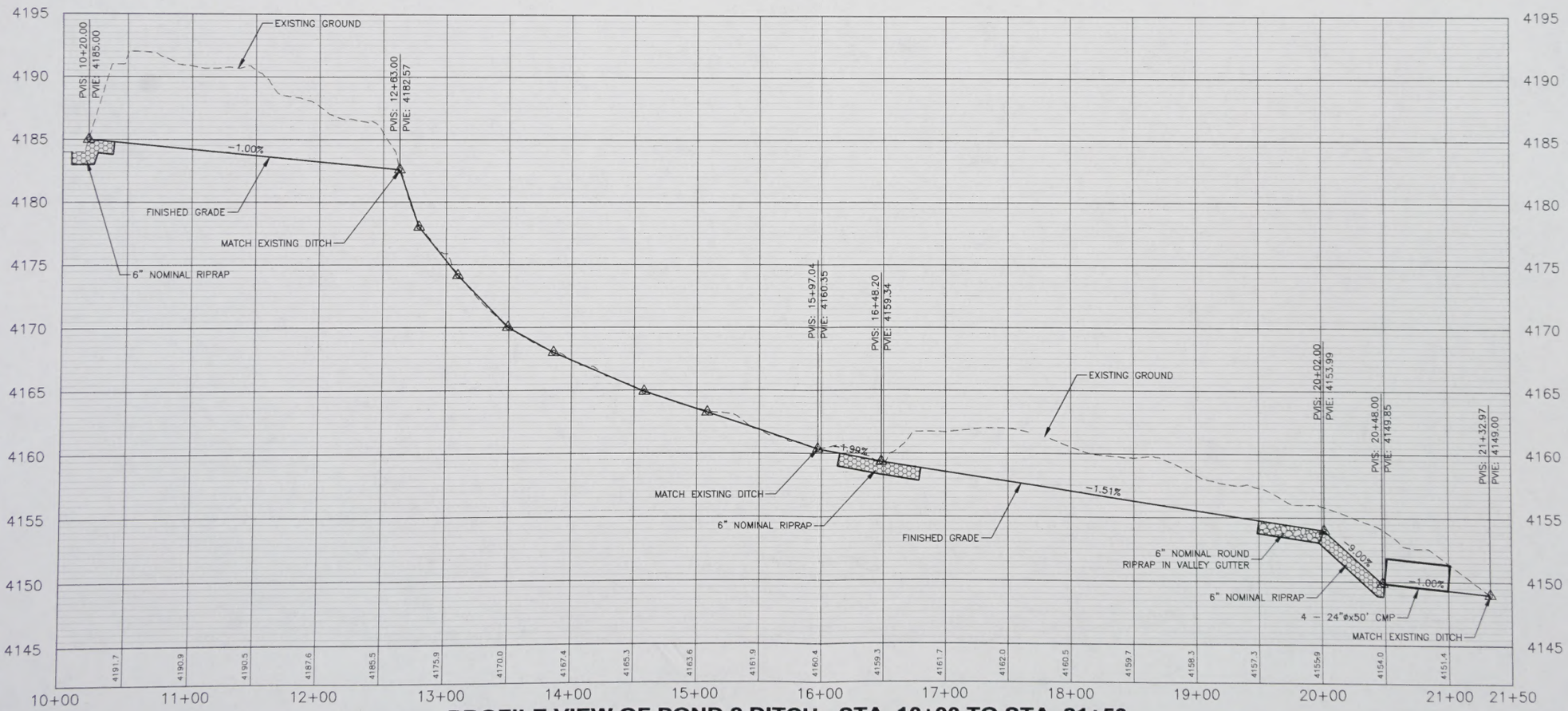
SHEET NO.
3
OF 5

F:\1-10204--Mr M Landfill\CADD 1-10204\Sheets\1-10204-03-SP.dwg



PLAN VIEW OF POND 2 DITCH - STA. 10+00 TO STA. 21+50

0 50 100
SCALE IN FEET



PROFILE VIEW OF POND 2 DITCH - STA. 10+00 TO STA. 21+50

HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT: 1-10204
DESIGNED: SMR / BAA
DRAWN: BAA
CHECKED: REC
APPROVED: SMR
DATE: MAY 23, 2011

STEPHANIE M. ROOPE — MONTANA — PROFESSIONAL ENGINEER — LICENSED

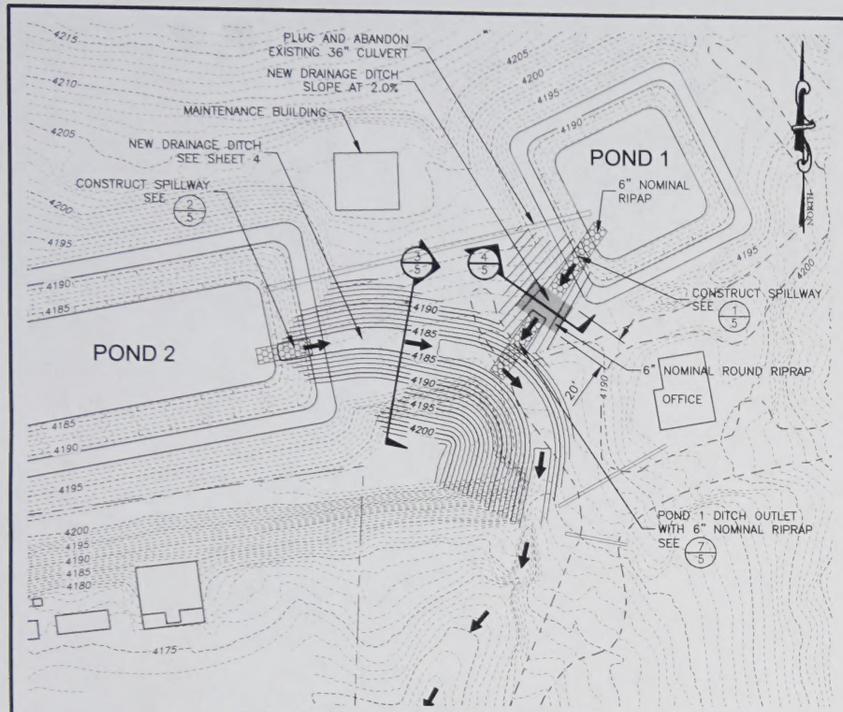
DRAFT

GreatWest engineering
2501 BELT VIEW DRIVE
HELENA, MT 59601
(406)449-8627

MISTER M LANDFILL
DRAINAGE IMPROVEMENTS
POND 2 DITCH PLAN AND PROFILE

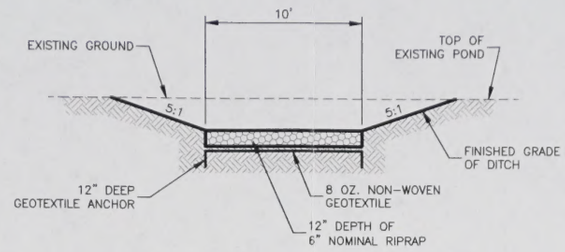
SHEET NO.
4
OF 5

F:\1-10204-Mr M Landfill\CADD 1-10204\Sheets\1-10204-04-PP.dwg

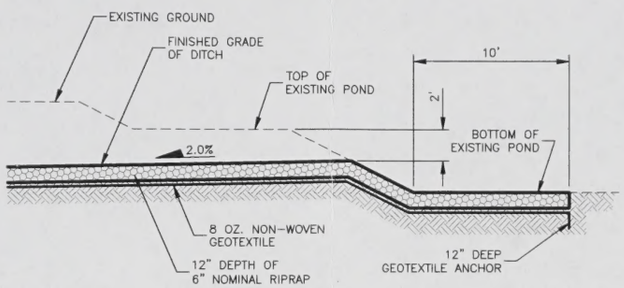


PLAN VIEW OF POND 1 DITCH

0 50 100
SCALE IN FEET



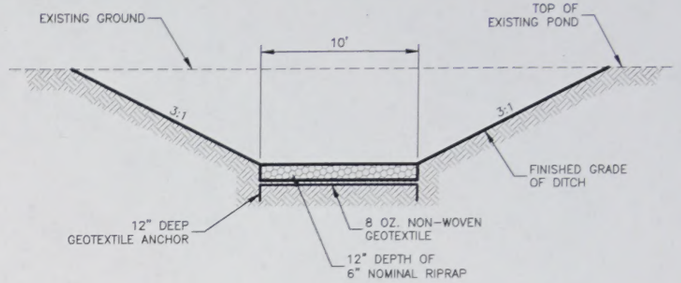
SECTION



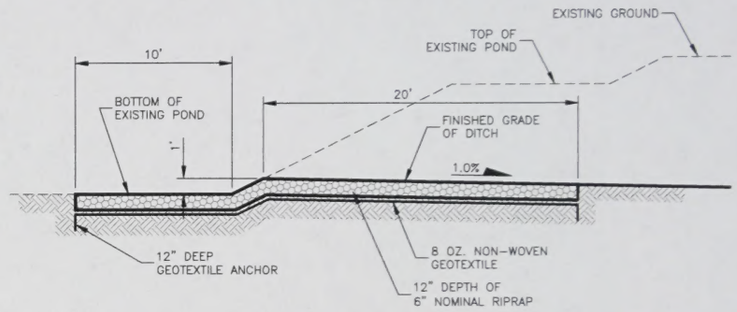
PROFILE

1/5 POND 1 SPILLWAY DETAIL

NOT TO SCALE



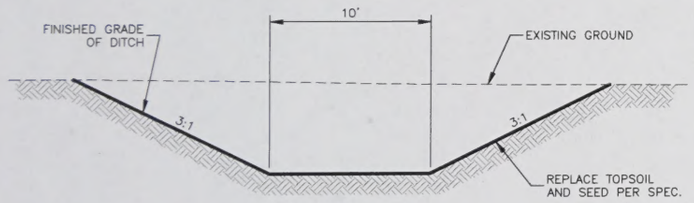
SECTION



PROFILE

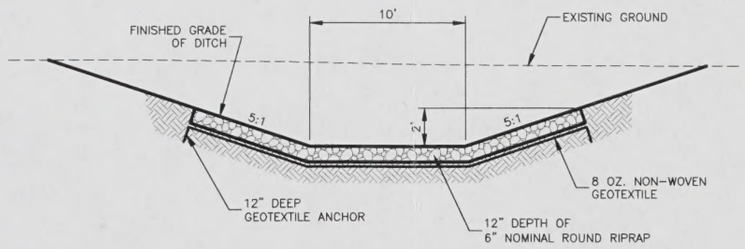
2/5 POND 2 SPILLWAY DETAIL

NOT TO SCALE



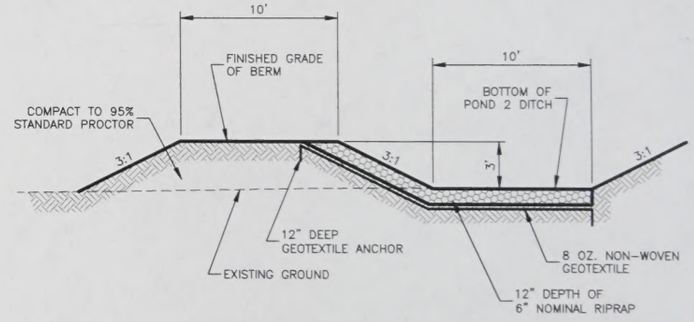
3/5 TYPICAL POND 2 DITCH SECTION

NOT TO SCALE



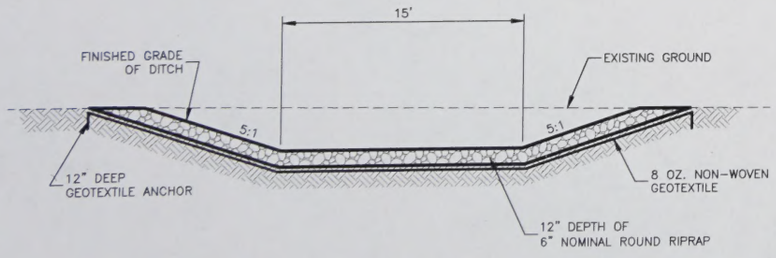
4/5 TYPICAL POND 1 DITCH SECTION

NOT TO SCALE



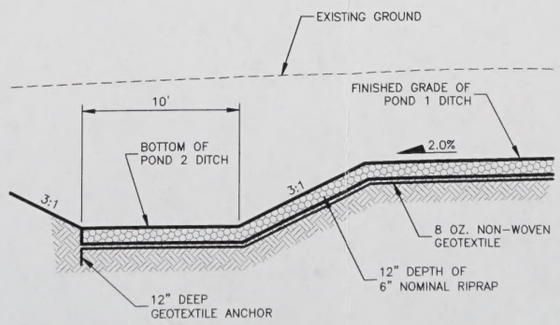
5/5 TYPICAL BERM SECTION

NOT TO SCALE



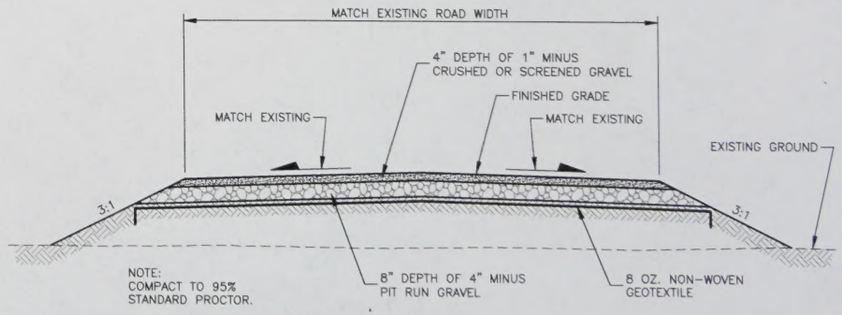
6/5 TYPICAL VALLEY GUTTER SECTION

NOT TO SCALE



7/5 POND 1 DITCH OUTLET DETAIL

NOT TO SCALE



8/5 TYPICAL GRAVEL ROAD SECTION

NOT TO SCALE

NO.	REVISION DESCRIPTION	BY	DATE

PROJECT: 1-10204
DESIGNED: SMR / BAA
DRAWN: BAA
CHECKED: REC
APPROVED: SMR
DATE: MAY 23, 2011

STEPHANIE M. ROOPE — MONTANA — LICENSED PROFESSIONAL ENGINEER
DRAFT

GreatWest engineering
2501 BELT VIEW DRIVE
HELENA, MT 59601
(406)449-8627

MISTER M LANDFILL
DRAINAGE IMPROVEMENTS
DETAILS

SHEET NO.
5
OF 5

F:\1-10204-Mr M Landfill\CADD 1-10204\Sheets\1-10204-05-Detail.dwg

M LANDFILL
MPROVEMENTS

CTION PLANS

HIP 15 N., AND RANGE 19 E.

T TO SCALE

SHEET INDEX

PROJECT: 1-10204
DATE: MAY 23, 2011

SHEET 1	COVER
SHEET 2	LEGEND - ABBREVIATIONS AND GENERAL NOTES
SHEET 3	SITE PLAN
SHEET 4	POND 2 DITCH PLAN AND PROFILE
SHEET 5	DETAILS

ORIGINAL

RECEIVED
MAY 24 2011
DEPT. OF ENVIRO. QUALITY
WASTE & UNDERGROUND TANK
MANAGEMENT BUREAU

NO.	REVISION DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			
6			

SET NO.

SHEET NO.
1

SECTION 00950

STANDARD MODIFICATIONS to MPWSS

SM-00001	GENERAL	2
SM-01010	SUMMARY OF WORK	2
SM-01041	PROJECT COORDINATION	3
SM-01050	FIELD ENGINEERING	3
SM-01300	SUBMITTALS	3
SM-01400	CONTRACTOR QUALITY CONTROL AND OWNER QUALITY ASSURANCE	4
SM-01500	CONSTRUCTION AND TEMPORARY FACILITIES	4
SM-01570	CONSTRUCTION TRAFFIC CONTROL	4
SM-01700	CONTRACT CLOSEOUT	5
SM-02110	GEOTEXTILES	5
SM-02112	REMOVAL OF EXISTING PAVEMENT, CONCRETE CURB, SIDEWALK, DRIVEWAY, AND/OR STRUCTURES	7
SM-02113	ADJUSTING EXISTING MANHOLES, LAMPHOLES, INLETS, WATER VALVE BOXES, WATER SERVICES, AND FIRE HYDRANTS TO GRADE	7
SM-02114	RELOCATING OR REMOVING UTILITY POLES, STREET SIGNS, AND MAILBOXES	8
SM-02221	TRENCH EXCAVATION AND BACKFILL FOR PIPELINES & APPURTENANT STRUCTURES	8
SM-02230	STREET EXCAVATION, BACKFILL, AND COMPACTION	14
SM-02234	SUB BASE COURSE	15
SM-02235	CRUSHED BASE COURSE	15
SM-02502	ASPHALT PRIME AND/OR TACK COAT	15
SM-02504	ASPHALT SEAL COAT	16
SM-02510	ASPHALT CONCRETE PAVEMENT	16
SM-02528	CONCRETE CURB AND GUTTER	18
SM-02529	CONCRETE SIDEWALKS, DRIVEWAYS, APPROACHES, CURB TURN FILLETS, VALLEY GUTTERS, AND MISCELLANEOUS NEW CONCRETE CONSTRUCTION	19
SM-03210	REINFORCING STEEL	21
SM-03310	STRUCTURAL CONCRETE	22
MD-02221-1	TYPICAL UTILITY TRENCH	24

SM-00001 GENERAL

These Standard Modifications apply changes, deletions, and additions to the Montana Public Works Standard Specifications Fifth Edition, March 2003 and 2006 Addendum, referred to collectively as the MPWSS. Each Section of the MPWSS that has been modified is listed in the Table of Contents of Section 00950 Standard Modifications to MPWSS. The entire Section from the MPWS has not been rewritten for these modifications. Instead, modifications are indicted for a specific subsection, paragraph, sentence or drawing.

Where a Standard Modification to MPWSS does not exist for a particular Section of MPWSS it shall be assumed the work is to be completed in accordance with the appropriate MPWSS Section. When a Standard Modification to MPWSS does exist the requirements of that modification supersede the related MPWSS requirement. Where paragraphs are specifically deleted or modified, or new paragraphs added, all other parts of the MPWSS will remain in effect unless otherwise modified by the Project Manual in accordance with the order of governance as specified in "Summary of Work".

Forms included in the Project Manual will be used in lieu of similarly titled forms in the MPWSS. Where Technical Specifications follow these Modifications in later Divisions of the Project Manual, those Specifications replace same numbered specifications in the MPWSS.

Delete Part 4: MEASUREMENT AND PAYMENT in all sections of the MPWSS. Payment for an item will only be made if that item is listed as a Bid Item in Section 00300: Bid Form. If an item is listed as a Bid Item, administrative and procedural requirements will be listed in Section 01275: Measurement and Payment. If an item is not listed as a Bid Item, the item is not required or is considered an incidental cost to other Bid Items.

SM-01010 SUMMARY OF WORK

Delete Section 01010.1.2.D and replace with the following:

D. The various portions of the Contract documents, of which these specifications are a part, are essential parts of the Agreement, and a requirement occurring in one is as binding as though occurring in all. All portions are intended to be complementary and to describe and provide for complete work as referenced in Article 3, General Conditions. Unless specifically noted otherwise, in the case of discrepancy, the following precedence will govern.

1. Permits from Town/City/County Departments and other agencies as may be required by law, which will govern over;
2. Change Orders, which will govern over;
3. Executed Agreement, which will govern over;
4. Addenda, which will govern over;
5. Special Provisions, which will govern over;
6. Divisions 1 through Division 16 Technical Specifications, which will govern over;

7. Funding Agency Special Provisions for Montana Public Facility Projects, which will govern over;

8. Standard Modifications to the Montana Public Works Standard Specifications, which will govern over;

9. Supplementary Conditions to the General Conditions, which will govern over;

10. General Conditions, which will govern over;

11. Drawings, which will govern over;

12. Contractor's Bid, which will govern over;

13. Montana Public Works Standard Specifications 2006 Addendum, which will govern over;

14. Montana Public Works Standard Specifications, Fifth Edition, March 2003, which will govern over;

15. Montana Department of Transportation Standard Specifications for Road and Bridge Construction, which will govern over;

16. Reference Specifications, which will govern over;

With reference to Drawings, the order of precedence is as follows:

1. Addenda/Change Order Drawings govern over any other Drawings.

2. Figures govern over scaled dimensions.

3. Contract Detail Drawings govern over Contract General Drawings.

4. Contract Drawings govern over Standard Drawings.

SM-01041 PROJECT COORDINATION

Delete Section 01041 in its entirety and replace with Section 01041: PROJECT COORDINATION contained in the Project Manual.

SM-01050 FIELD ENGINEERING

Delete Section 01050 in its entirety.

SM-01300 SUBMITTALS

Delete Section 01300 in its entirety and replace with Section 01300: SUBMITTALS contained in the Project Manual.

SM-01400 CONTRACTOR QUALITY CONTROL AND OWNER QUALITY ASSURANCE

Delete Section 01400 in its entirety and replace with Section 01400: CONTRACTOR QUALITY CONTROL AND OWNER QUALITY ASSURANCE contained in the Project Manual.

SM-01500 CONSTRUCTION AND TEMPORARY FACILITIES

Delete Section 01500 in its entirety and replace with Section 01500: CONSTRUCTION AND TEMPORARY FACILITIES contained in the Project Manual.

SM-01570 CONSTRUCTION TRAFFIC CONTROL

Delete Sections 01570.1.3.B and C and replace with the following:

B. Prepare traffic control Drawings and submit to the Engineer for approval at least 14 days prior to the beginning of construction or change in a zone of work. Do not commence work until said plan is approved.

C. Cooperate with the Engineer and the Owner to adjust traffic control Drawings as required to fit specific field conditions. Modifications to construction timing based upon field adjustments to the traffic control plan will not constitute a claim for additional payment to the Contractor.

D. The Engineer will forward traffic control Drawings and subsequent changes to the Drawings to the Montana Department of Transportation (MDT) for any work performed within MDT right-of-way. The Contractor is responsible for making all modifications to traffic control Drawings required by MDT based upon their review. No time extension will be given for delays caused by failure to gain approval of plan by MDT.

E. Notify all impacted parties (including but not limited to landowners, businesses, and residents adjacent to the work, local utilities, City and County personnel, emergency services, school district transportation directors, and the postal service) regarding the type and duration of the construction.

F. For project sites involving a through street, provide the Engineer with a news release when submitting the traffic control Drawings. Include in the release, as a minimum, the work activity and duration. Once approved, furnish the news release to the local media at least 2 weeks before starting work.

Add Section 01570.1.4.

1.4 TRAFFIC CONTROL OFFICER

A. Name one employee responsible to coordinate traffic control for the entirety of the project. Assure the individual responsible for traffic control remains on-site whenever construction activity is taking place.

Delete Section 01570.3.1.B and replace with the following.

B. Inspect the work area at least twice a day during construction, including weekends, holidays, and other non-working days. Correct all deficiencies discovered during inspections and assure traffic control is appropriate to the work. Maintain records of traffic control devices used and their location and daily checklists, signed by the traffic control officer, for each inspection.

Delete Section 01570.3.2.C and replace with the following.

C. The Contractor is solely responsible for the construction traffic control system including removing, repairing, or replacing any traffic control device not providing its intended function. The Engineer will periodically observe the traffic control for compliance with the approved traffic control Drawings and inform the Contractor of any discovered non-compliance.

SM-01700 CONTRACT CLOSEOUT

Delete Section 01700 in its entirety and replace with Section 01700: CONTRACT CLOSEOUT contained in the Project Manual.

SM-02110 GEOTEXTILES

Delete Section 02110.2.1.A and replace with the following.

A. Assure that fibers used in the manufacture of geotextiles, and the threads used in joining geotextiles by sewing, consist of long-chain synthetic polymers, composed of at least 95 percent by weight polyolefins or polyesters. They must be formed into a network so the filaments on yarns retain dimensional stability relative to each other, including selvedges. Furnish materials meeting the physical requirements listed in Section 2.4 or as shown on the plans.

Add Section 02110.2.1.B

B. Provide moderate or high survivability non-woven polypropylene fabric that is inert to commonly encountered chemicals and soils and that remains stable over a temperature range of -50 degrees Fahrenheit (-46° C) to 150 degrees Fahrenheit (66° C) and at a pH range of 2 to 13.

Add Section 02110.2.3.B

B. At the time of installation, the fabric will be rejected if it has defects, seams or weakness, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation or storage.

Add Section 02110.2.4

2.4 MATERIALS

A. Drainage Fabric.

1. Furnish Class 2 fabric as specified in AASHTO M 288 – Geotextile Specifications for Highway Applications.

B. Separation Fabric.

1. Furnish Class 1 fabric as specified in AASHTO M 288 – Geotextile Specifications for Highway Applications.

C. Stabilization Fabric.

1. Furnish Class 1 fabric as specified in AASHTO M 288 – Geotextile Specifications for Highway Applications.

D. Permanent Erosion Control Fabric.

1. Furnish Class 1 fabric, as specified in AASHTO M 288 – Geotextile Specifications for Highway Applications, with an Apparent Opening size of #40, #60, #70, or #100 (US Sieve No.), as shown on the plans.

E. Silt Fence Fabric.

1. Support silt fence with either wood or metal fence posts.

2. Assure silt fence geotextile meets the minimum requirements in the following table:

Required Properties for Silt Fence		
Property	Test Method	Value
Minimum Grab Tensile Strength (lbs)	ASTM D4632	≥125
Minimum Grab Tensile Strength, X Direction (lbs)	ASTM D4632	≥100
Minimum Permittivity (sec^{-1})	ASTM D4491	≥0.05
Maximum Apparent Opening (US Sieve No.)	ASTM D4751	#30
Ultraviolet Stability (% Retained After 500 hrs of Exposure)	ASTM D4355	≥70

F. Landfill Cell Filter Fabric.

1. Assure landfill cell filter fabric minimum requirements in the following table:

Required Properties for Landfill Cell Filter Fabric		
Property	Test Method	Value
Minimum Grab Tensile Strength (lbs)	ASTM D4632	390
Grab Tensile Elongation (%)	ASTM D4632	50
Puncture (lb)	ASTM D4833	240
Maximum Apparent Opening Size (US sieve number)	ASTM D4751	100

Delete Section 02110.3.3.B and C and replace with the following.

B. Overlap geotextile a minimum of 24 inches (60 cm) at the ends and sides of adjoining sheets or sew the geotextile joints according to the manufacturer's recommendations. Overlap the uphill or upstream sheet over the downhill or downstream sheet. Offset end joints of adjacent sheets a minimum of 5 feet (1.5 m). Pins may be used to hold the geotextile sheets in place other than on interior slopes of lagoons or ponds. Space pins along the overlaps at approximately 3 foot (1 m) centers.

C. Place aggregate, slope protection, or riprap on the geotextile starting at the toe of the slope and proceed upward. Place materials by overhead construction methods or in such a manner that no vehicles or equipment operate directly on the fabric. Place riprap onto the geotextile from a height of less than 12 inches (30 cm). Place slope protection rock or aggregate backfill onto the geotextile from a height less than 3 feet (1 m). In underwater applications, place the geotextile and cover material in the same day.

SM-02112 REMOVAL OF EXISTING PAVEMENT, CONCRETE CURB, SIDEWALK, DRIVEWAY, AND/OR STRUCTURES

Delete Section 02212.3.1.C and replace with the following.

C. Remove and dispose of existing private concrete driveways and/or sidewalks which interfere with construction of street improvements or which do not match new grade as shown on the contract documents or as directed by the Engineer. Remove such driveways and/or sidewalks to distance of 8 inches (20 cm) behind curbs, or to greater distance if required to properly match the new curb and gutter grade. Remove along the neat line produced by a concrete saw cut. Make cuts to a depth of the thickness of the driveway and/or sidewalk or to a maximum depth of 6 inches (15 cm), whichever is lesser, and take care in removing the concrete assuring the slab breaks on the sawed neat line.

SM-02113 ADJUSTING EXISTING MANHOLES, LAMPHOLES, INLETS, WATER VALVE BOXES, WATER SERVICES, AND FIRE HYDRANTS TO GRADE

Delete Section 02113.3.1.E and replace with the following.

D. Provide backfill material conforming to the requirements of Section 02235, 1 inch (25 mm) Minus Crushed Base Course, and compacted to at least 97 percent of the maximum dry density as determined by AASHTO T99 or ASTM D698.

SM-02114 RELOCATING OR REMOVING UTILITY POLES, STREET SIGNS, AND MAILBOXES

Delete Section 02114.3.1.A and replace with the following.

A. Affected utility companies are to move power, street light, and telephone poles, unless they are designated in the contract documents to be removed or relocated by the Contractor. If a utility company is non-responsive, notify Engineer. Coordinate all utility relocation activity with the construction activity.

SM-02221 TRENCH EXCAVATION AND BACKFILL FOR PIPELINES & APPURTENANT STRUCTURES

Add the following publications to the list in Section 02221.1.2.A.

ASTM D4235	Relative Density
ASTM D4254	Relative Density

In Section 02221.1.3, delete the reference to Standard Drawings 02221-1: Typical Utility Trench Detail and refer to the attached Modified Standard Drawing 02221-1.

Delete Section 02221.1.4.A.1 replace with the following.

1. Meet the testing requirements of Special Provisions and Section 01400: Contractor Quality Control and Owner Quality Assurance.

Delete Section 02221.1.4.A.3 and replace with the following.

3. Re-testing failing areas is at the expense of the Contractor. Where Engineer provides testing on behalf of the Owner, the Contractor will be assessed the cost of all retests conducted by the Engineer, with that cost deducted from the progress payments.

Delete Section 02221.1.4.B.1 and replace with the following.

1. Quality assurance tests will be made by the Contractor for each on-site natural soil or each source of off-site material, including borrow material, to determine the laboratory maximum density values and optimum compaction moisture content according to ASTM D698.

Delete Section 02221.1.4.C.3 and replace with the following.

3. Submit to the Engineer laboratory moisture-density relationship testing results of on-site and off-site borrow soils.

Delete Section 02221.2.1.A and replace with the following.

A. TYPE 1 PIPE BEDDING

1. Type 1 Pipe Bedding includes the material placed from 4 inches (10 cm) below the bottom of the pipe to 6 inches (15 cm) over the pipe.

2. Provide Type 1 Bedding consisting of crushed stone or gravel, which is free of cementitious substances or thin, flat particles in an amount that would cause the material to cake, pack, or otherwise form and unyielding support for the pipe.

3. Provide imported granular material with a gradation as follows and a maximum plasticity index of 6, determined by AASHTO T89 and T90 or by ASTM D4318.

Percent by Weight Passing	
Sieve Size	% Passing
1" (25 mm)	100
3/4" (19.0 mm)	90 - 100
3/8" (9.5 mm)	20 - 55
No. 4 (4.75 mm)	5 - 10
No. 8 (2.36 mm)	0 - 5

4. Crush material so that the percentage of fractured particles in the finished product is as constant and uniform as practical. Crush to produce material where at least 50 percent of the material retained on the No. 4 sieve has at least one fractured face.

5. To prevent migration of material from around the pipe, do not use sand, sandy gravel, or a material composed mainly of sand for bedding material in the pipe zone where ground water is or will be present or where existing material contains voids which would allow migration. Where trench excavation encounters wet or unstable material, Type 1 Pipe Bedding must be well graded, free draining, and non-plastic.

6. Refer to the Special Provisions and details in the Drawings for other requirements.

Delete Section 02221.2.1.B in its entirety.

Delete Section 02221.2.1.D.3 and replace with the following.

3. Type 2 Bedding consists of granular material meeting the following gradation and having a maximum plasticity index of 6 and a maximum liquid limit of 25 percent.

Percent by Weight Passing	
Sieve Size	Type B-Modified
3" (75 mm)	100
No. 4 (4.75 mm)	0 - 25
No. 8 (2.36 mm)	0 - 10

Delete Section 02221.3.3.A.8 and replace with the following.

8. No classification of trench excavated material materials will be made. Excavation and trenching work includes the removal and subsequent handling of all earth, loose or cemented gravel, loose or solid rock, and other materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof. All materials excavated or otherwise removed including asphalt, curb, butter, sidewalk, soils, etc., will become the property of the Contractor, who will be responsible for environmentally sound disposal of said material in accordance with state and federal regulations.

Add Section 02221.3.3.B.2.b.

b. If the trench is excavated wider than the specified minimum, provide Type 1 Pipe Bedding for the additional width to yield a consistent backfill for the entire width of the trench or take such other measures as the Engineer may direct to protect the pipe against the crushing forces of trench backfill at the Contractor's expense.

Delete Section 02221.3.3.E.2 and replace with the following.

2. Remove and replace all pavement damaged during construction by the Contractor's equipment, or the use thereof, to at least a depth of 1 inch (25 mm). Patches will not be allowed less than 1 inch (25 mm) in thickness.

Add Sections 02221.3.3.E.3 and 4.

3. Replace all asphalt pavement damaged during construction outside of restoration pay limits in conjunction with asphalt restoration and as otherwise required by the Engineer. Provide asphalt meeting the requirements of Section 02510: Asphalt Concrete Pavement, and place asphalt to produce a final surface uniform in texture and consistent with the line and grade of adjacent pavement or as directed by Engineer. No compensation will be allowed for removal and replacement of damaged pavement outside of the pay limits for asphalt restoration.

4. Assure work and materials for pavement restoration is in accordance with Section 02510: Asphalt Concrete Pavement.

Delete Section 02221.3.4.A and replace with the following.

A. GENERAL

1. Furnish all necessary labor, equipment, and incidentals necessary to dewater the project site during construction.

2. Keep all excavation dry and free from water during construction and the placement of materials. Do not place pipe, bedding, or backfill materials below the groundwater elevation established by dewatering operations. Do not allow ground water or stormwater to enter or flow through the underground piping during installation.

3. The cost of dewatering operations will be incidental to the cost of pipeline and appurtenance installation and no additional payment will be made for dewatering. Consider shifts in the groundwater level caused by changing seasons or local conditions in estimating the cost of dewatering operations, as no additional payments will be made for fluctuating groundwater levels.

4. Protect all structures that could be potentially impacted by dewatering operations. Repair any damage to structures caused as a result of dewatering at Contractor's expense.

Add Section 02221.3.4.B.

B. DISCHARGE

1. Do not discharge or dispose of water from dewatering operations in such a manner as to flood existing landscaped areas, graveled areas, or structures unless approved by Engineer. Written permission from the appropriate landowner shall also be required for discharge or disposal on private property.

2. It is the Contractor's responsibility to comply with requirements and regulations of federal, state, and local agencies that govern areas affected by dewatering of the construction site and application for, and maintenance of, any required permits.

Add Sections 02221.3.6.A.2 and 3.

2. Storage of all imported backfill materials, including protecting said materials from adverse conditions that would disqualify them from use under these specifications, is the responsibility of the Contractor.

Delete Sections 02221.3.6.B.1.a and b and replace with the following.

a. Place Type 1 Pipe Bedding material 4 inches (10 cm) under, around the pipe, and to a point 6 inches (15 cm) above the top of the pipe in 6 inch (15 cm) lifts, using hand or other compaction methods without damaging or disturbing the pipe including mains and service lines and all appurtenances.

b. Place bedding material in equal lifts on both sides of the pipe for the full trench width. Thoroughly compact each lift of pipe bedding by tamping, vibration, slicing with a shovel, rodding, or by a combination of these methods. Take special care to assure complete compaction under the haunches of the pipe.

Delete Section 02221.3.6.B.2 in its entirety.

Delete Section 02221.3.6.C.1 and replace with the following.

1. After the pipe bedding materials are placed and compacted as specified, backfill the trench.

   a. Use backfill material free of cinders, ash, refuse, organic or frozen material, boulders, or other deleterious material.

   b. From the top of the Type 1 Bedding to 6 inches (15 cm) below the ground surface, or the subgrade elevation, material containing stone up to 8 inches (20 cm) in the greatest dimension may be used.

   c. Cost of screening, drying, or moistening excavated backfill to comply with specifications will be considered incidental to the Contractor's bid price per linear foot of pipe and service lines, and unit prices for appurtenances, and no additional payment will be made for such work.

Delete Sections 02221.3.6.C.6.a through c and replace with the following.

a. Type A Trench Backfill. Place trench backfill in maximum 8 inch (20 cm) compacted lifts within 3 percent of optimum moisture content and compact to at least 95 percent of maximum dry density determined by AASHTO T99 or by ASTM D698. For materials that do not exhibit a typical well-defined moisture-density curve, compact backfill to 70 percent relative density as determined by ASTM D4253 and D4254.

b. Type B Trench Backfill. Place trench backfill in maximum 8 inch (20 cm) compacted lifts within 3 percent of optimum moisture content, and compact to at least 90 percent of maximum dry density determined by AASHTO T99 or by ASTM D698. For materials that do not exhibit a typical well-defined moisture-density curve, compact backfill to 50 percent relative density as determined by ASTM D4253 and D4254.

c. Type C Trench Backfill. Place and compact Type C Trench Backfill in maximum 12 inch (30 cm) lifts at densities equal to or greater than the densities of adjoining undisturbed soil. Mound earth over the trench top, if so directed by the Engineer. In cultivated areas, place stripped topsoil uniformly over the backfilled trench to the original depth. Do not compact the topsoil, but grade to provide a smooth surface conforming to the adjoining ground surfaces.

Delete Section 02221.3.6.D and replace with the following.

D. Replacement of Unsuitable Backfill Material

1. Remove and dispose of excavated soils that are saturated, contain deleterious materials, or have characteristics that, in the opinion of the Engineer, render the soils unsuitable as backfill **and**/or which cannot be readily conditioned or dried to be made suitable.

2. Replace unsuitable soils with material obtained from trench excavations within the project limits at the expense of the Contractor.

3. If suitable replacement material is not available within project limits, notify the Engineer. The Engineer will quantify the extent of any unsuitable soils to be removed and replaced with material from and approved source, to be paid for as Imported Backfill Material, and provide written notification of the approved quantities to the Contractor. Payment for Imported Backfill Material will not be approved if Contractor fails to notify the Engineer and/or proceeds with removal and disposal of unsuitable material prior to receiving written notice from the engineer.

4. Provide imported backfill material with a gradation as follows and a maximum plasticity index of 10, determined by AASHTO T89 and T90 or by ASTMD4318. Imported backfill may not contain rock measuring greater than 6 inches (15 cm) in the greatest dimension.

Percent by Weight Passing	
Sieve Size	% Passing
1" (25 mm)	70 -100
No. 4 (4.75 mm)	40 - 80
No. 10 (2.00 mm)	25 - 60
No. 200 (0.075 mm)	2 - 35

5. Place and compact all imported material according to the applicable backfill specification requirements.

Delete Section 02221.3.6.F.1 and replace with the following.

1. Provide warning tape as described in this Section. Bury tape a maximum of 18 inches (45 cm) below finish surface grade.

Add Section 02221.3.8.B.

B. Dispose of vegetation; coarse debris resulting from pavement or sidewalk removal; stones, junk, debris, and other materials encountered in excavation work; and other similar waste materials away from the site of the work at the Contractor's expense.

Delete Section 02221.3.9.C and replace with the following.

C. The maximum permissible distance between backfilling/compaction operations and the end of newly installed pipe is 100 feet (30 m) in existing streets (and/or alleys) and 200 feet (60 m) in all other areas.

Delete Section 02221.3.9.E. and replace with the following.

E. For each work group consisting of a trench excavator, a pipe laying crew, and a backfilling/compaction crew, the maximum allowable open ditch at any time is 200 feet (60 m) in existing streets (and/or alleys) and 400 feet (120 m) in all other areas.

Add Section 02221.3.9.G.

G. At the completion of each working day, fill all trenches and/or provide safety netting, Jersey barrier, and other barricades required for public safety.

Add Section 02221.3.10.

3.10 DRAINAGE CROSSINGS

A. Where trenches are constructed in or across roadway ditches or other water courses, protect the backfill from surface erosion by adequate means. Where the grade of the ditch exceeds 1 percent, prevent erosion by a suitable method approved by the Engineer. Backfill trenches in such a manner that water will not accumulate in unfilled or partially filled trenches.

B. Remove all material deposited in roadway ditches or other water courses crossed by the trench immediately after backfilling is completed and restore the section, grades, and contours of such ditches or water courses to their original conditions, in order that the surface drainage is obstructed no longer than necessary.

SM-02230 STREET EXCAVATION, BACKFILL, AND COMPACTION

Delete Section 02230.1.3.A and replace with the following.

A. Field Density Testing

1. Meet the testing requirements of Special Provisions and Section 01400: Contractor Quality Control and Owner Quality Assurance.

2. Assure in-place field density tests meet ASTM D1556 (AASHTO T191) Sand Cone Method or ASTM D2922 and D3017 (AASHTO T238 and T239) Nuclear Densometer Methods. Quality assurance field density testing frequency is at the Engineer's discretion.

Delete Section 02230.3.1.A and replace with the following.

A. Perform Clearing and grubbing including the excavation, removal and disposal of roots, stumps, sod, or any organic material and buried debris from within construction limits. Construction limits are defined by all areas within the cut/fill limits and extending 1 foot (0.3 m) beyond the back of sidewalk and/or curb and gutter, or 2 feet (0.6 m) beyond the

edge of pavement if no sidewalk or curb and gutter is present. Remove unsuitable material to at least 12 inches (30 cm) below subgrade elevation.

Delete Section 02230.3.4.A and replace with the following.

A. Excavate to the specified lines and grade or as directed by Engineer. Excavate without causing rutting, pumping, or other disturbances to underlying materials.

SM-02234 SUB BASE COURSE

Delete Section 02234.2.5.A and replace with the following.

A. Use water from an approved source.

SM-02235 CRUSHED BASE COURSE

Delete Section 02235.2.2.C and replace with the following:

C. Crush material so that the percentage of fractured particles in the finished product is as constant and uniform as practical. Crush to produce material where at least 50 percent of the material retained on the No. 4 sieve has at least one fractured face.

Delete Section 02235.2.4.A and replace with the following.

A. Use water from an approved source.

SM-02502 ASPHALT PRIME AND/OR TACK COAT

Delete Section 02502.2.1.A and replace with the following:

A. Unless otherwise specified, furnish asphalt material grade and typed as specified below.

1. Furnish Liquid Asphalt, MC-70 meeting the requirement of Section 702 of the MDT Standard Specifications for all asphalt prime coat applications.

2. Furnish Liquid Asphalt, MC-800 and/or MC-3000 meeting the requirement of Section 702 of the MDT Standard Specifications for all chip seal applications on gravel roads.

3. Furnish Emulsified Asphalt, SS-1 meeting the requirements of Table 1 in this section for all asphalt tack coat applications.

4. Furnish Emulsified Asphalt, CRS-2 or CRS-2P meeting the requirements of Table 2 in this section for all asphalt chip seal applications.

Add the following to Section 02502.3.2.B:

A. Apply MC-70 at a rate of 0.20 gallons per square yard (0.91 L/m^2) on all asphalt prime coat applications.

SM-02504 ASPHALT SEAL COAT

Add the following to Section 02504.2.2.A:

A. Unless otherwise specified, furnish ½ inch (13 mm) seal coat aggregate meeting the requirements of Section 2510: Asphalt Concrete Pavement and Table 1 in this section for all chip seal applications on gravel roads. Unless otherwise specified, furnish $^{3}/_{8}$ inch (9.5 mm) seal coat aggregate meeting the requirements of Section 2510: Asphalt Concrete Pavement and Table 2 for all chip seal applications on asphalt roads.

Add the following to Section 02504.3.3.B:

2. Do not perform seal coat work if the local weather forecast includes a predicted temperature lower than 45 degrees Fahrenheit (7° C) within 12 hours after the intended close of the work for the day.

3. Do not perform seal coat work if the local weather forecast includes a probability of precipitation greater than 45 percent within the intended schedule of operations for the day. Regardless of the weather forecast, seal coat work may be suspended if impending adverse weather conditions occur in the vicinity of the work.

Delete Section 02504.3.3.D.1 and add the following:

1. Apply asphalt material at a rate of 0.35 gallons per square yard (1.6 L/m^2) when using Emulsified Asphalt CRS-2 or CRS-2P, and at a rate of 0.50 (2.3 L/m^2) gallons per square yard when using Liquid Asphalt MC-800 or MC-3000. Apply asphalt material at a rate of 0.20 gallons per square yard (0.9 L/m^2) for sand seal applications. Apply the asphalt material uniformly at the rate specified.

Delete Section 02504.3.3.E.1 and add the following:

1. Apply seal coat material at a rate of 25 pounds per square yard (13.6 kg/m^2) on all chip seal applications. Apply seal coat material at a rate of 15 pounds per square yard (8.1 kg/m^2) on all sand seal applications. During the course of the work, make adjustments in the rate of application as required or as directed by the Engineer.

SM-02510 ASPHALT CONCRETE PAVEMENT

Delete Section 02510.2.1.B and C and replace with the following.

B. Unless otherwise specified, furnish Type B or B-Modified aggregate meeting the requirements of Table 2 in this section for all asphalt pavement applications.

C. Unless otherwise specified, furnish (PGAB) PG58-28 Asphalt Binder Material meeting the requirements of Table 3 in this section for all asphalt pavement applications.

Delete Section 02510.2.2.H and replace with the following.

H. Produce coarse aggregate retained on the No. 4 sieve (4.75 mm) having a minimum of 75 percent by weight of particles with at least two mechanically fractured faces. When fractures are contiguous, assure the angle between the fracture planes is at least 30 degrees to count as two fractured faces.

Add the following to Table 2 in Section 02510.2.2.L.1.

Percent by Weight Passing	
Sieve Size	Type B-Modified
1" (25 mm)	---
3/4" (19 mm)	100
1/2" (12.5 mm)	82 - 95
3/8" (9.5 mm)	70 - 90
No. 4 (4.75 mm)	45 - 65
No. 10 (2.00 mm)	32 - 45
No. 40 (0.425 mm)	15 - 25
No. 200 (0.075 mm)	4 - 8

Add the following to Section 02510.2.5.B.2:

All type B-modified asphaltic concrete surfacing shall meet the following Marshall Design criteria as determined by ASTM D1559.

a. Number of Compaction Blows, Each End of Specimen 75

b. Stability, Minimum ..... 1500 lbs.

c. Flow ..... 8 – 16

d. Air Voids, Percent ..... 3% - 5%

e. Percent Air Voids Filled with Bitumen 65-75

Add the following to Section 02510.3.14.B.3:

d. Skin patching will not generally be considered a satisfactory method of repair.

e. Tack coat all existing edges prior to placing new asphalt concrete.

Delete Section 02510.3.9 and replace with the following.

A. Sampling and testing of the aggregates and other constituent materials will meet the requirements of Special Provisions and Section 01400: Contractor Quality Control and Owner Quality Assurance.

Delete Section 02510.3.16.A.1 and add the following:

1. The maximum lift thickness is 3 inches (compacted depth) for surface courses and 6 inches (compacted depth) for base courses.

Delete Section 02510.3.29 and replace with the following.

3.29 PAVEMENT AND MATERIAL TESTING REQUIREMENTS

A. Meet the testing requirements of the Special Provisions and Section 01400: Contractor Quality Control and Owner Quality Assurance.

B. Owner or Owner's representative may perform field density testing of the pavement through the use of a nuclear densometer and/or by providing 4 inch diameter core samples of the asphalt surface courses.

C. The Owner or Owner's representative may determine the field thickness of the pavement by inserting a flat blade through the material to the previously placed base, measuring core samples, or other approved method. The actual measured thickness must be within ¼ inch (6.35 mm) of the specified thickness. When the measurement of any field thickness is less than the plan thickness by more than the allowable deviation, the actual thickness of the pavement in this area may be determined by taking additional measurements at intervals parallel to the centerline in each direction from the affected locations until, in each direction, pavement is found which is not deficient by more than the allowable deviation. Additional measurements of field thickness are considered as re-testing of failing areas.

D. In all cases, the costs of the following tests are at Contractor's expense:

1. Initial Aggregate Tests

2. Job Mix Formula

3. Any Tests Contractor Requires for Quality Control for Crushing, Screening, or Other Construction Operations

4. Re-testing of Failing Tests or Required Additional Testing

E. Correct all pavement composition and field density deficiencies at Contractor's expense. Areas found deficient in thickness by more than the allowable deviation will be evaluated by the Engineer. If the Engineer determines the deficient areas warrant removal, remove and replace the areas with asphaltic concrete of the thickness shown on the Drawings at the Contractor's expense.

SM-02528 CONCRETE CURB AND GUTTER

Delete Section 02528.2.3.A and replace with the following.

A. Furnish pre-formed expansion joint material meeting the requirements of AASHTO M213.

Add Section 02528.2.5.A.2.

2. Apply liquid membrane-forming compound between April 15 and August 14 of each year.

Add Section 02528.2.5.B.2.

2. Apply water-soluble or emulsified linseed oil compound between August 15 and April 14 of each year.

Delete Section 02528.3.2.B and replace with the following.

B. Complete excavation to the lines shown in the Contract Documents, or as specified by Engineer.

Delete Section 02528.3.4.A and replace with the following.

A. Place reinforcement as required by Contract Documents or Engineer's direction. Place and hold in position before placing concrete.

Delete Section 02528.3.6.B.1 and replace with the following.

1. Finish the surface of the concrete curbs and gutters true to the lines and grades shown on the Drawings. Work concrete until the coarse aggregate is forced down into the body of the concrete and no coarse aggregate is exposed.

Delete Section 02528.3.9.A and replace with the following:

A. Complete the curb backfill to 4 inches (10 cm) below the top of curb before final grading the subgrade and placing the base course of the street section.

Delete Section 02528.3.9.E and replace with the following.

E. Compact backfill to prevent settlement and level the surface to be free draining. Complete all backfill within 4 days after curb and gutter is placed.

SM-02529 CONCRETE SIDEWALKS, DRIVEWAYS, APPROACHES, CURB TURN FILLETS, VALLEY GUTTERS, AND MISCELLANEOUS NEW CONCRETE CONSTRUCTION

Delete Standard Drawing 02529-6, Retrofit Drive Approach, from the list in Section 02529.1.2.A and the drawing itself in its entirety from Appendix A.

Delete Sections 02529.3.2.A and B and C and replace with the following.

A. Excavate to the specified depth, or as directed by the Engineer. Assure the concrete subgrade has a firm and even surface and is compacted as specified in Section 02230, as may be modified by the Standard Modifications.

B. Place and compact at least 3 inches (75 mm) of gravel base material to a firm, even surface. This requirement is waived for concrete if it is to be installed on street base

course material exceeding 3 inches (75 mm) or more in thickness and is approved by Engineer.

C. Do not remove sidewalks, private driveways, or conduct foundation preparation activities more than 4 day prior to the planned concrete pour.

Delete Section 02529.3.4.A and replace with the following.

A. Place and hold in position reinforcement meeting the contract requirements, or as directed by Engineer, before placing the concrete.

Delete Section 02529.3.6.B.1 and replace with the following.

1. Finish the concrete surface true to lines and grades shown on the Drawings. Work concrete until the coarse aggregate is forced down into the body of the concrete and no coarse aggregate is exposed. Float the concrete surface using a magnesium float to a smooth and uniform surface. Plastering of the surface is prohibited. Edge all outside edges of the slab and all joints using a ¼ inch (6.4 mm) radius edging tool.

2. Immediately after the forms have been removed, remove all form bolts and tie wires to a depth of at least ½ inch (12.5 mm) below the surface of the concrete. Clean and fill all holes and depressions caused by the removal or setting back of form bolts or tie wires with Portland cement mortar composed of 1 part cement by volume and 2 parts sand. Chip out, clean and fill all rock pockets, honey, and air pockets with mortar, in compliance with instruction of the Engineer. If, in the judgment of the Engineer, rock pockets are of such an extent or character as to materially affect the strength of the structure or to endanger the life of the steel reinforcement, he may declare the concrete defective and order the complete removal and replacement of that portion of the structure so affected.

3. Carefully make all mortar patches using a very dry mortar tamped firmly in the void. Keep the patches wet for a period of 3 days after which it will be inspected for shrinkage cracks. Excessive cracking will require complete removal and replacement of the patch.

4. Screed, float and light broom finish sidewalks, exterior slabs, approaches, etc. and membrane cure. After concrete has hardened sufficiently, give the surface a broom finish. Obtain Engineer approval of the broom before use. Assure the broom strokes are square across the concrete from edge to edge, overlapping adjacent strokes. Broom without tearing the concrete. Assure the broomed finish produces regular corrugations not exceeding $^{1}/_{8}$ inch (3.2 mm) in depth.

5. Steel trowel finish interior floor surfaces which will be exposed after construction is completed, surfaces to be covered with resilient floor coverings or seamless floor coverings, the exposed portion of the top of equipment bases, the top of interior curbs, and other surfaces designated on the Drawings. Perform troweling after the second floating when the surface has hardened sufficiently to prevent an excess of fines from being drawn to the surface. Produce a dense, smooth, uniform surface free from blemishes and trowel marks.

6. Apply liquid or shake-on floor hardener to all interior concrete floors which are subject to foot or equipment traffic and are not required to be covered with resilient floor coverings or seamless flooring. Prior to application, thoroughly clean the floor of all dirt, grease, and other foreign matter. Do not apply curing compounds to floors scheduled to receive floor hardener unless compatibility with the hardener is demonstrated in manufacturer's data.

Delete Section 02529.3.9.C and replace with the following

C. Compact backfill to prevent settlement and level the surface to a neat appearing and free draining surface within 4 days after concrete is placed. Where required by the contract, topsoil shall be placed to the lines and grades of the work. The addition of topsoil, seed, and/or sod and all finish grading work shall be completed and ready for inspection within 6 days of concrete placement.

Delete Section 02529.3.11.A and replace with the following.

A. Construct new street monuments, new street light bases, and other miscellaneous concrete construction in accordance with the detail drawings, or as directed by Engineer.

Add Section 02529.3.11.B.

B. New concrete construction required to maintain or restore existing structures will be considered incidental to the cost of pipe installation and no additional payments made. Include the concrete costs associated with thrust blocks with the unit costs bid for the valve, fittings, or appurtenance requiring the thrust block. New concrete work not included above, or specifically called out on the Drawings, must first be approved by Engineer.

Add Section 02529.3.11.C.

C. Construct all curb ramps with detectable warning surfaces in conformance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Detectable warning surfaces shall be black. Detectable warning surfaces shall be considered deficient and subject to replacement by the Contractor if more than 5 percent of the truncated domes on a ramp surface are missing or damaged, if the detectable warning product has lost any adhesion to the concrete, or if the detectable warning product is cracked or shows other signs of distress, at the end of the two year warranty period.

SM-03210 REINFORCING STEEL

Delete Section 03210.2.1.A and replace with the following.

1. Furnish deformed reinforcement steel meeting ASTM A615, (AASHTO M31) or ASTM A705, Grade 60.

Delete Section 03210.3.3.A and replace with the following.

A. Accurately place and hold firm all steel reinforcement in the plan locations, or as directed by Engineer, as concrete is being placed. Thrusting dowels into freshly poured concrete is prohibited.

Delete Section 03210.3.3.C and replace with the following.

C. Overlap welded wire fabric for successive mats or rolls providing an overlap measured between outermost cross wires of each fabric sheet not less than the greatest spacing of the cross wires plus 2 inches (50 mm) but not less than 6 inches (150 mm), whichever is greater. Extend the fabric across supporting beams and walls to within 4 inches (100 mm) of concrete edges. It may extend through contraction joints. Adequately support the fabric during concrete placement to maintain its position in the slab using the methods previously described or by laying the fabric on a concrete layer of the required depth before placing the upper slab layer.

Delete Section 03210.3.3.G and replace with the following.

G. Follow the minimum concrete protective covering for reinforcement below, unless noted otherwise on the Drawings.

SM-03310 STRUCTURAL CONCRETE

Delete Section 03310.1.3.B and replace with the following.

B. Employ, at the Contractor's expense, a testing laboratory acceptable to the Engineer to perform material evaluation tests, the mix design prior to placing any concrete, and all acceptance testing during the onsite placement of the concrete. Retesting or additional testing of concrete or materials failing to meet the requirements of these specifications must be done by the Contractor at no additional cost to the Owner.

Amend the footnote for Table 2.2 in Section 03310.2.2.B.4 to read the following.

*Air content tolerance is plus two percent (+2%) to minus one percent (-1%).

Delete Section 03310.3.7.A.2.a and replace with the following.

a. During each day's pour, check the consistency of the concrete by slump test. Also perform a slump test each time a test cylinder is made. Assure slump tests meet ASTM C143 "Method of Test for the Slump of Portland Cement Concrete."

Delete Section 03310.3.7.A.3.h and replace with the following.

h. When concrete fails to meet the requirements above or when tests of field cured cylinders indicate deficiencies in protection and curing, the Contractor may order tests on the hardened concrete under Chapter 17.3 of ACI-301-84 or load tests in Chapter 20 of the ACI Building Code (ACI 318-83) for that portion of the structure where the questionable concrete has been placed. In the event the load or core tests also indicate

that the structure is unsatisfactory, make all modifications as directed by the Engineer to make the structure sound.

Delete Section 03310.3.7.A.4.a and replace with the following.

a. During each strength test, check the air content by either ASTM C231 "Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C173 "Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method", or ASTM C138 "Method of Test for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete."

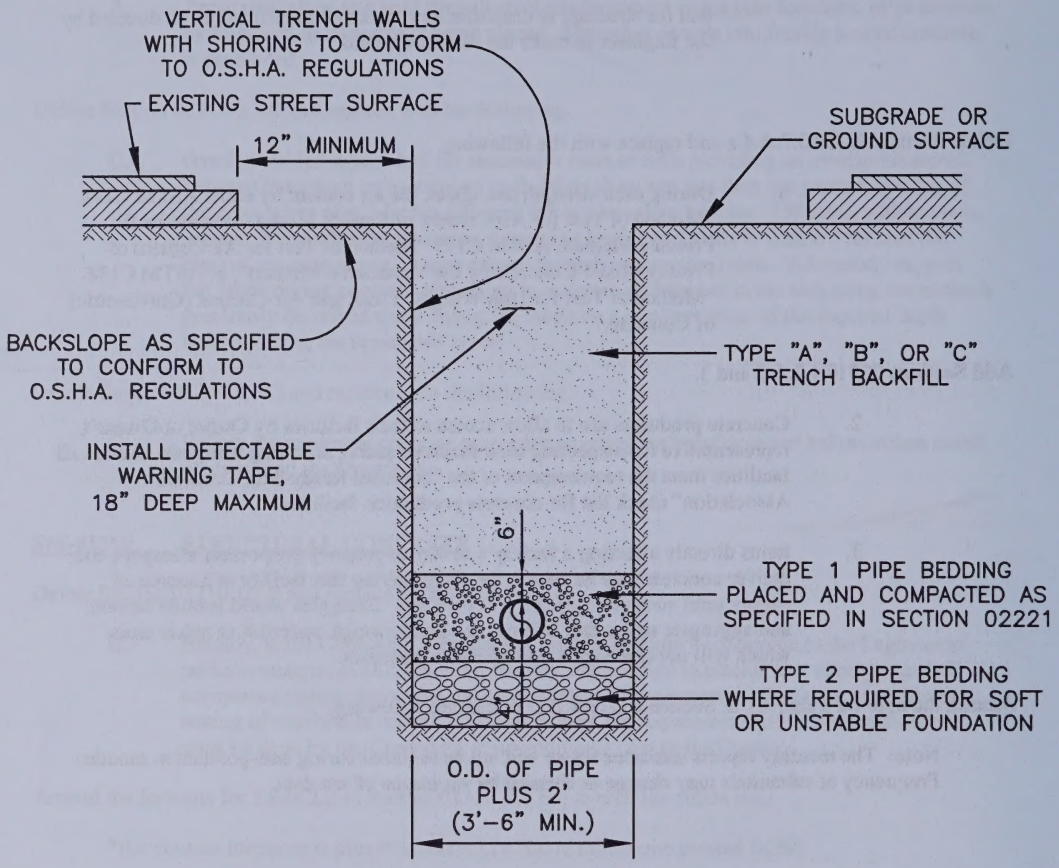
Add Sections 03310.4.2.A.2 and 3.

2. Concrete producers are to allow access to their facilities by Owner or Owner's representative for inspecting their facilities and/or sampling materials. Assure all facilities meet the requirements of the "National Ready-Mix Concrete Association" check list for concrete production facilities.

3. Items directly affecting a facility's ability to properly proportion, transport, and deliver concrete may be reason for disqualifying that facility as a source of supply until such deficiencies are corrected. Examples would include cement and aggregate scales that will not accurately weigh materials or mixer units which will not thoroughly mix concrete materials.

Amend the note for Table 4.1 in Section 03310.4.2.D to read the following.

Note: The monthly reports indicated above will not be required during non-production months. Frequency of submittals may change as dictated by variations of test data.



NOTES:

1. WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT, THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING.
2. WHERE NEAT LINE IS LESS THAN 3' FROM EDGE OF EXISTING PAVEMENT OR CURB AND GUTTER SECTION, REMOVE AND REPLACE ENTIRE PAVEMENT SECTION BETWEEN TRENCH AND EDGE OF PAVEMENT.
3. PROVIDE TEMPORARY CAP OVER THE NON-CONNECTING END OF EACH PIPE PRIOR TO PLACEMENT IN THE TRENCH. REMOVE CAP ONLY WHEN SUBSEQUENT JOINING PIPE IS IN THE TRENCH READY TO BE CONNECTED.

REVISED: 12-3-07

GreatWest engineering	SCALE: NONE	TYPICAL UTILITY TRENCH	MODIFIED STANDARD DRAWING NO. 02221-1

SECTION 01275

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and Special Provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for measurement and payment.

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: The Measurement and Payment sections do not necessarily name all incidental items required to complete the work. The cost of all such incidentals shall be included in the various related items of work. All estimated quantities stipulated in the Bid Forms or other Contract Documents are approximate and are to be used only as a basis for estimating the probable cost of the work and for the purpose of comparing the proposals submitted for the work. It is understood and agreed that the actual amounts of work performed and materials furnished under unit price items may differ from such estimated quantities and the payment for such work and materials shall be based on the actual amount of work done and materials furnished in each case.

C. Engineer will determine the actual quantities and classifications of Unit Price Work performed by the Contractor.

D. List of Bid Items: A list of unit Bid Items is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each Bid Item.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST BID ITEMS

A. Bid Item No. 1- MOBILIZATION

1. Description: This item covers the costs of preparatory work and operations. **Any bids that contain a lump sum bid price for mobilization greater than 10% of the bid price for the respective schedule or additive alternative may be rejected at the option of the Owner.**
2. Work Required: Work required under this section includes but is not limited to the following.
   a. The movement of personnel, equipment, supplies and incidentals to the project site
   b. The establishment of all facilities necessary for the work on the project;
   c. The costs of obtaining the required permits, bonds, and insurance; and
   d. All other work and operations which must be performed, or costs incurred prior to beginning work on the various items of the project.
3. Unit of Measurement: Lump Sum
4. Measurement: Measurement for MOBILIZATION will be made as a percentage completed of the lump sum. 50% of the lump sum will be credited to the first progress payment, with the second 50% being credited to subsequent progress payments in proportion to total construction completed as a percentage of the contract unit price.
5. Payment: Payment for MOBILIZATION will be made at the contract unit price bid as a lump sum.

B. Bid Item No. 2 – CULVERTS:

1. Description: This item shall meet the requirements of Sections 02234, 02235, and 02720 of the MPW Standard Specifications. Contractor shall install cross drains and approach pipes at the sizes and locations shown on the plans.
2. Work required under this section shall include but not be limited to the following:
   a. Furnishing, excavating, placement, and backfilling of the culverts at the locations shown on drawings;
   b. Furnishing, installing, maintaining, replacing, and operating necessary construction traffic control devices throughout the work period;
   c. Preparing and submitting the traffic control plan and making adjustments as required for final approval;
   d. Restoring road to the section shown on the plans;
   e. Provide gradation and proctor tests for aggregates as required;
   f. Furnish and install road stabilization fabric;
   g. Loading, hauling, and spreading the aggregate base and surface course material;
   h. Blending, watering and compacting;
   i. Finish grading to the lines and grade of existing road;
   j. All labor, tools, equipment, materials, royalties, incidentals necessary to complete the work as specified.
3. Unit of Measurement: Lineal foot

4. Measurement: Measurement for CULVERTS will be per LINEAL FOOT as indicated in the Bid Form and as shown on the plans.
5. Payment: Payment for CULVERTS will be made at the contract unit price bid per LINEALFOOT as indicated in the Bid Form.

C. Bid Item No. 3 – CUT, PLUG AND ABANDON EXISTING CULVERT:
1. Description: As shown on the Drawings, the culvert connecting Pond 1 and Pond 2 shall be abandoned. The Contractor shall cut, plug and abandon the existing culvert. Cut the old culvert back, and either cap or plug with a fitting designed for the purpose or fill in and around the pipe end with one quarter yard of concrete.
2. Work Required: Work required under this section shall include but not be limited to the following.
   a. Trench excavation, backfill, and compaction;
   b. Dewatering, sheeting, and shoring;
   c. Furnishing and installing concrete plug;
   d. All labor, tools, equipment, materials, royalties, and incidentals necessary to complete the work as specified.
3. Unit of Measurement: Per Each.
4. Measurement: CUT, PLUG AND ABANDON EXISTING CULVERT will be measured per each, regardless of size.
5. Payment: Payment will be made at the contract unit price bid per each for CUT, PLUG AND ABANDON EXISTING CULVERT as indicated in the Bid Form.

D. Bid Item No. 4 – EARTHWORK:
1. Description: This item shall cover site grading as indicated on the drawings and in the contract documents. Contractor shall grade all sections of roads and ditches as shown on the plans. Contractor to insure positive drainage on all ditches to a minimum depth as identified in the typical section. Engineer may require a flood test to be done on ditches to test for positive drainage. No additional costs for flood test. Contractor shall also construct the berm to the lines and grades as shown on the plans.
2. Work required under this section shall include but not be limited to the following:
   a. Clearing & grubbing;
   b. Strip & stockpile topsoil;
   c. Disposal of excess or unsuitable material:
   d. Stockpiling excess materials to be used in berm;
   e. Supplying all necessary testing;
   f. Providing water for compaction of subgrade;
   g. Temporary erosion control measures;
   h. Final grading, cleanup;
   i. The Contractor to construct ditches and spillways to provide positive drainage;
   j. Contractor to move trailers, remove and neatly stock pile any fence, landscaping rock, surface trash, etc. that may be in the way of constructing new ditch section or berm.
   k. Placing topsoil on disturbed areas;
   l. All labor, tools, equipment, materials, royalties, incidentals necessary to complete the work as specified.
3. Unit of Measurement: LUMP SUM

4. Measurement: Measurement for EARTHWORK will be per lump sum as indicated in the Bid Form and as shown on the plans.
5. Payment: Payment for EARTHWORK will be made at the contract unit price bid per lump sum as indicated in the Bid Form.

E. Bid Item No. 5. – RIPRAP
1. Description: This item includes supplying and installing the riprap to the lines and grades shown on the plans.
2. Work required under this section shall include, but not be limited to the following:
   a. Providing material submittals:
   b. Preparing subgrade for riprap, including all work associated with geotextile fabric;
   c. Furnish and install geotextile fabric;
   d. Furnish and place riprap material to the lines and grade shown on the Plans;
   e. Grade, level, and compact riprap material to a well graded, uniform surface;
   f. All labor, tools, equipment, materials, royalties and incidentals required to complete the work as specified.
3. Unit of Measurement: Lump Sum
4. Measurement for RIPRAP will be per lump sum as indicated in the Bid Form and as shown on the plans.
5. Payment: Payment for RIPRAP will be made at the contract unit price bid per lump sum as indicated in the Bid Form.

F. Bid Item No. 6. – SEED AND FERTILIZE:
1. Description: This item includes seeding and fertilizing disturbed areas with approved mixtures. All areas that the Contractor disturbs shall be seeded and fertilized.
2. Work required under this section shall include but not be limited to the following:
   a. Provide certifications of weed free seed mix;
   b. Seed bed preparation;
   c. Seeding and fertilizing the disturbed areas;
   d. Protection of the seeded areas and reseeding as required during the maintenance period;
   e. All labor, tools, equipment, materials, royalties, and incidentals necessary to complete the work as specified.
3. Unit of Measurement: Lump Sum
4. Measurement: Measurement for SEED AND FERTILIZE shall be made per lump sum as indicated in the Bid Form.
5. Payment: Payment for SEED AND FERTILIZE shall be made at the contract lump sum price bid as indicated in the Bid Form.

END OF SECTION

SECTION 02232

SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Protecting existing trees and vegetation to remain.
   2. Removing trees and other vegetation.
   3. Clearing and grubbing.
   4. Topsoil stripping.
   5. Removing above-grade site improvements.
   6. Disconnecting, capping or sealing, and abandoning site utilities in place.
   7. Disconnecting, capping or sealing, and removing site utilities.

B. Related Sections include the following:
   1. Division 1 Section "Construction and Temporary Facilities" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
   2. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings according to Division 1 Section "Closeout Procedures."
   1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Improvements on Adjoining Property: Work on adjoining properties is not included in the scope of this project.

C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

D. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earth Work."
   1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TREE PROTECTION

A. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
   1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
   2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
   1. Cover exposed roots with burlap and water regularly.
   2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
   3. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
   4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Engineer.
   1. Employ a qualified arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
   2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified arborist.

E. Transplant trees and vegetation indicated to be relocated to the location designated by the Engineer, in a manner approved by Engineer.
   1. Employ a qualified arborist or landscaping expert, licensed in jurisdiction where Project is located, to transplant trees and shrubs.
   2. Operation shall be completed in such manner as to protect the root wad of the tree or other vegetation.

3.3 UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing when requested by Contractor.
   1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
   1. Owner will arrange to shut off indicated utilities when requested by Contractor.
   2. Arrange to shut off indicated utilities with utility companies.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Engineer not less than two weeks in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Engineer's written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
   1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
   2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
   3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
   4. Use only hand methods for grubbing within drip line of remaining trees.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
   1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
   1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water.
   1. Do not stockpile topsoil within drip line of remaining trees.
   2. Dispose of excess topsoil as specified for waste material disposal.
   3. Stockpile surplus topsoil and allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

3.7 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them in a location approved by the Owner.

END OF SECTION

SECTION 02234

SUB BASE COURSE

PART 1: GENERAL

1.1 DESCRIPTION

A. This work is constructing a sub-base course of either crushed or uncrushed materials meeting the specified gradations and other quality criteria specified herein.

1.2 REFERENCES

AASHTO T11	Amount of Material Finer Than No. 200 (0.075 mm) Sieve in Aggregate
AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T89	Determining Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T176	Sand Equivalent Value of Soils and Fine Aggregate
AASHTO T96	Resistance to Degradation By Abrasion and Impact in the Los Angeles Machine
AASHTO T99 (ASTM D698)	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5-lb (2.5 kg) Rammer and 12-Inch (305 mm) Drop
ASTM D5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
AASHTO T191 (ASTM D1556)	Density of Soil in-Place By Sand Cone Method
AASHTO T310 (ASTM D6938)	In-Place density and water content of the soil and soil aggregate by Nuclear Method (Shallow Depth)

1.3 DENSITY CONTROL TESTING

A. Field Density Testing

1. Meet the quality control and quality assurance testing requirements in section 01400, Contractor Quality Control and Owner Quality Assurance.

2. In-place field density tests for quality assurance are at Owner expense meeting AASHTO T191 (ASTM D1556) Sand Cone method or AASHTO

T310 (ASTM D 6938), Nuclear Densometer method. Quality assurance field density testing frequency is at the discretion of the Engineer.

3. Retesting of failing areas is at the expense of the Contractor.

B. Laboratory Maximum Density and Optimum Moisture

1. Moisture density curves will be provided by the Contractor for each base material supplied. These will be provided at the expense of the Contractor.

C. Materials Submittals

1. Submit to the Engineer gradations, moisture density curves and other preliminary test results for sources to be used for base materials prior to delivery to the site for approval by the Engineer. If recycled materials are proposed, CBR test data must be submitted to the Engineer to assure consistency with design requirements.

PART 2: PRODUCTS

2.1 GENERAL

A. Furnish select sub-base material meeting the applicable aggregate quality.

2.2 UNCRUSHED SUBBASE

A. Furnish material consisting of hard, durable stone, gravel or other similar materials mixed or blended with sand, stone dust, recycled concrete and/or asphalt or other binding or filler materials produced from approved sources, providing a uniform mixture meeting these specifications and compacted into a dense and well- bonded sub base. Oversize material of acceptable quality may be crushed and used in the base material, if the blend meets the specified gradations.

B. Assure the material retained on the No.4 sieve has a wear not exceeding 50 percent at 500 revolutions as determined by AASHTO T96.

2.3 CRUSHED SUBBASE

A. Furnish material having both fine and coarse crushed stone or crushed gravel, and/or natural gravel, and when approved, blended with soil, sand, screenings. recycled concrete and/or asphalt or other materials.

B. Furnish crushed gravel or stone consisting of hard, durable particles, not containing excessive flat, elongated, soft or disintegrated rock, dirt, or other

deleterious matter, and having a wear not exceeding 50 percent at 500 revolutions as determined by AASHTO T96.

C. Use production methods that produce a percent of fractured rock in the finished product that is constant and uniform. Crush aggregate so that at least 25% of the material is retained on the No.4 sieve and has one or more mechanically fractured faces.

2.4 GRADATION

A. Produce material, including any added binder or filler, meeting the following Table of Gradations as determined by AASHTO Methods T11 and T27:

TABLE OF GRADATIONS

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVES

Passing	4" Minus	3" Minus	2" Minus	1 1/2" Minus	1" Minus
4 Inch	100				
3 Inch	---	100			
2Inch	---	---	100		
11/2 Inch	---	---	---	100	
1 Inch	---	---	---	---	100
No.4	25-60	25-60	25-60	25-60	25-70
No.40	10-30	10-30	10-30	10-30	10-30
No.200	2-10	2-10	2-10	2-10	2-10

B. Up to 5% "oversized" material is permitted provided that the "oversized" material passes the screen size immediately larger than the top size specified. The material between the maximum screen opening and the No.4 sieve shall be reasonably well graded.

C. Suitability of the aggregate is determined by the gradation testing of material placed in the project as required in the Contract documents, within the allowable limits described by the Table of Gradations for the particular grading specified.

D. Assure the liquid limit for the aggregate fraction passing a No.40 sieve does not exceed 25, nor the plasticity index exceed 6, as determined by AASHTO T89 and T90.

2.5 WATERING:

A. Use uncontaminated water.

PART 3: EXECUTION

3.1 PREPARATION

A. Immediately before placing the base course, blade smooth and shape the underlying subgrade, sub-base or base course to the plan cross section before the base course is placed on the street. Do not place sub-base course on wet or muddy subgrade or sub-base course. Maintain at least one completed area of finished and accepted subgrade or sub-base course in advance of placing base course.

3.2 PLACEMENT AND SPREADING

A. Mix and place the material in maximum 6-inch (15 cm) horizontal layers loose thickness. Deposit and spread each load of material on the prepared subgrade, or on a completed sub-base course layer continuously without breaks. Assure hauling over the subgrade or over any completed sub base course does not damage the subgrade, sub-base or base course.

B. Spread using dump boards, spreader boxes, or moving vehicles equipped to distribute the material in a uniform layer or a windrow. Place and spread the material in a uniform layer to the specified depth without causing segregation. Once the base course is spread, blade-mix it the full depth by alternately blading the entire layer to the centerline and back to the roadway edge.

C. For multiple layers, mix each layer as specified above. Blade smooth and compact each layer before placing the succeeding layer.

D. Uniformly add water, when required, on site and place in amounts required to compact the material as necessary to aid in densification and to limit segregation. Maintain an adequate water supply during the work. Assure the equipment used for watering is of the capacity and design to provide uniform water application.

E. Apply water during the work to control dust and to maintain the base course in a damp condition.

F. Where crushed sub-base is specified, produce a product with at least 25% of the material retained on the No.4 sieve having one or more fractured faces.

G. Water required for compacting base gravel may be obtained from the municipal system if approved by the Owner, or from other sources.

H. Compact the material using appropriate tamping equipment or power rollers. Correct all irregularities or depressions that develop under rolling by scarifying the material and adding or removing material, as required, until the surface meets specifications.

I. Blade and compact alternately, as required to produce the specified surface until final inspection. Tamp the material along curbs, headers, manholes, and similar structures and all places inaccessible to rollers using approved mechanical tampers or hand tampers meet field density requirements.

3.3 FIELD DENSITY REQUIREMENTS

A. Furnish watering and rolling to obtain a minimum field density of 95 percent of the maximum dry density determined by AASHTO T99. No separate compensation is allowed for rolling and watering the sub-base course other than the sub-base course bid item or items listed on the Contract documents.

3.4 SURFACE TOLERANCES

A. Finish the sub-base course so that when tested using a 10-foot (3 m) straight edge placed on the surface with its center line parallel to the street center, the maximum surface deviation from the straight edge does not exceed 1/2-inch (12.7 mm). Additionally, the finished grade cannot deviate more than 0.1 foot (30 mm) at any point from the staked elevation and the sum of the deviations from two points not more than 30 feet (9.14 m) apart cannot exceed 0.1 feet (30 mm).

B. Perform all sub base course corrections to meet the above tolerances using approved methods and materials. Payment for patching aggregate is at the unit price bid for the sub-base course material.

PART 4: MEASUREMENT AND PAYMENT

4. 1 CUBIC YARD BASIS: SUB-BASE COURSE

A. This item is measured and paid for by the cubic yards (cubic meters) of uncrushed or crushed, sub-base course of the specified gradations, complete in place. at the contract unit price bid for _____"Minus Crushed or Uncrushed Sub base Course", which constitutes full compensation for furnishing, loading, hauling, spreading, blending, shaping, watering, and compacting the sub-base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. _____" Minus Uncrushed Sub base Course - per cubic yard.(cubic meter)
2. _____" Minus Crushed Sub Base Course - per cubic yard. (cubic meter)

4. 2 SQUARE YARD BASIS: SUB BASE COURSE

A. This item is measured and paid for by the square yard (square meter) of sub base surface area for furnishing crushed or uncrushed, sub-base course of the thickness and gradations specified, complete in place, at the contract unit price bid for _____" Thickness of____" Minus Crushed or Uncrushed Sub Base Course", which constitutes full compensation for furnishing, loading, hauling, spreading, shaping, blending, watering and compacting the sub-base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. _____" Thickness of ____" Minus Un-crushed Sub-Base Course-per square yard (square meter).

2. _____" Thickness of ____" Minus Crushed Sub-Base Course-per square yard (square meter).

4. 3 LINEAR FOOT BASIS: SUB BASE COURSE

A. This item is measured and paid for by the linear feet of trench restored, measured along the trench centerline, with crushed or uncrushed, sub-base course of the gradations specified, complete in place, at the contract unit price bid for _____" Minus Crushed or Uncrushed Sub-Base Course", which constitutes full compensation for furnishing, loading, hauling, spreading, blending, shaping, watering, and compacting the sub-base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. _____" Minus Uncrushed Sub-Base Course - per linear foot (linear meter).

2. _____" Minus Crushed Sub-Base Course - per linear foot (linear meter).

END OF SECTION

SECTION 02235

CRUSHED BASE COURSE

PART 1: GENERAL

1.1 DESCRIPTION

A. This work is the placing of one or more base courses composed of crushed gravel, stone or other similar materials meeting the gradation and other quality criteria specified herein.

1.2 REFERENCES

AASHTO T11	Amount Finer than No. 200 (0.075 mm) Sieve in Aggregate
AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T89	Determining Liquid Limit of Soils
AASHTO T90	Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T176	Sand Equivalent Value of Soils and Fine Aggregate
AASHTO T96	Resistance to Degradation By Abrasion and Impact in the Los Angeles Machine
AASHTO T99 (ASTM D698)	Moisture-density Relations of Soils and Soil-Aggregate Mixtures Using 5-lb (2.5 kg) Rammer and 12-Inch (305 mm) Drop
ASTM D5821	Determining the Percentage of Fractured Particles in Coarse Aggregate
AASHTO T191 (ASTM D1556)	Density of Soil In-Place By Sand Cone Method
AASHTO T310 (ASTM D6938)	In-Place density and water content of the soil and soil aggregate by Nuclear Method (Shallow Depth)

1.3 DENSITY CONTROL TESTING

A. Field Density Testing

1. Meet the quality control and quality assurance testing requirements in section 01400, Contractor Quality Control and Owner Quality Assurance.

2. In-place field density tests for quality assurance are at Owner expense meeting AASHTO T191 (ASTM D1556) Sand Cone method or AASHTOT310 (ASTM (D6938) Nuclear Densometer method. Quality

assurance field density testing frequency is at the discretion of the Engineer.

3. Retesting of failing areas is at the expense of the Contractor.

B. Laboratory Maximum Density and Optimum Moisture

1. Moisture density curves will be provided by the Contractor for each base material provided. These will be provided at the expense of the Contractor.

1.4 MATERIALS SUBMITTALS

1. Submit to the Engineer gradations, moisture density curves and other test results for sources to be used for base materials prior to delivery to the site for approval by the Engineer. . If recycled materials are proposed, CBR test data must be submitted to the Engineer to assure consistency with design requirements.

PART 2: PRODUCTS

2.1 GENERAL

A. Furnish aggregate base material meeting the applicable aggregate quality requirements.

2.2 CRUSHED BASE MATERIAL

A. Consists of both fine and coarse fragments of crushed stone or crushed gravel, and/or natural gravel, and when approved, blended with sand, finely crushed stone, crusher screenings, recycled concrete and/or asphalt or other similar materials.

B. Use crushed stone or gravel consisting of hard, durable particles of fragments of stone, free of excess of flat, elongated, soft or disintegrated pieces, dirt, or other deleterious matter, and having a percent of wear of not exceeding 50 at 500 revolutions when tested under AASHTO T96.

C. Crush material so that the percentage of fractured particles in the finished product is as constant and uniform as practical. Crush to produce material where at least 35 percent of the material retained on the No. 4 sieve has at least one fractured face.

D. Incorporate all material produced in the crushing operation and passing the No. 4 mesh sieve into the base material necessary to meet the gradation requirements.

2.3 GRADATION

A. As determined by AASHTO Methods T11 and T27, furnish material for the grading specified in the contract documents including binder or filler, which may have been added at the plant or at the site, meeting the requirements of that grading in the Table of Gradations below:

TABLE OF GRADATIONS

PERCENTAGES BY WEIGHT PASSING SQUARE MESH SIEVE

Passing	1 ½" Minus	1" Minus	¾" Minus
1 1/2 Inch	100		
1 Inch	—	100	
3/4 Inch	—	—	100
1/2 Inch	—	—	—
No. 4 Sieve	25 - 60	40 - 70	40 - 70
No. 10 Sieve	—	25 - 55	25 - 55
No. 200 Sieve	0 - 8	2 - 10	2 - 10

B. Up to 5% "oversized" material is permitted provided that the "oversized" material passes the screen size immediately larger than the top size specified. The produced material between the maximum screen opening and the No.4 sieve shall be reasonably well graded.

C. Suitability of the aggregate is based on samples obtained during placement in the project within limits allowed in the table for the particular grading specified.

D. That portion of the fine aggregate passing the No. 200 sieve must be less than 60 percent of that portion passing the No. 40 sieve.

E. The liquid limit for that portion of the fine aggregate passing a No. 40 sieve cannot exceed 25, nor the plasticity index exceed 6, as determined by AASHTO T89 and T90.

2.4 WATERING:

A. Use uncontaminated water.

PART 3: EXECUTION

3.1 GENERAL

A. Before placing the base course, smooth and shape the surface of the underlying subgrade, sub-base or base course to the cross section shown on the plans before placing the base course.

B. Do not place base course on a wet or muddy subgrade or sub-base course. Complete at least one area of finished and accepted subgrade, sub-base or underlying base before the placing of any base course.

3.2 PLACEMENT AND SPREADING

A. Mix and place the material in maximum 8 inches (20 centimeters) compacted layers unless otherwise approved. Deposit and spread each load of material on the prepared subgrade, or on a completed sub-base or base course layer continuously without interruption. Discontinue operating haul units over subgrade, or over any sub-base or base course completed if the haul units damage the subgrade, sub-base or base course.

B. Deposit and spread the material in a uniform layer, without segregation, to a loose depth so that when compacted, and making allowance for any filler to be blended on the road, the layer has the specified thickness.

C. Spread material using dump boards, spreader boxes, or vehicles equipped to distribute the material in a uniform layer. The material may be deposited in windrows mixed and spread as described below.

D. Construct each layer meeting these requirements. Blade smooth and thoroughly compact each layer as specified before placing the succeeding layer.

E. If segregation or moisture problems exist, or if the material was placed on the road in windrows, thoroughly blade-mix the material of the affected layer by alternately blading to the center and back to the edges of the street.

F. Uniformly add water, when required, on site and place in amounts required to compact the material as necessary to aid in densification and to limit segregation. Maintain an adequate water supply during the work. Assure the equipment used for watering is of the capacity and design to provide uniform water application.

G. Apply water during the work to control dust and to maintain the base course in a damp condition in accordance with Section 01500 under Dust Control.

H. Water required for compacting base gravel may be obtained from the municipal system if approved by the owner, or from other sources.

3.3 FIELD DENSITY REQUIREMENTS

A. Compact placed material the full width by rolling with suitable tamping equipment or power rollers. Correct all irregularities or depressions that develop during rolling by loosening the material in these places and adding or removing material, as required.

B. Perform blading and compacting alternately as required or directed, to maintain a smooth, even, uniformly compacted surface until the final inspection. Along curbs, headers, manholes, and similar structures, and at all places not accessible to the roller, compact the base course material with suitable mechanical tampers or hand tampers to reach the compaction requirements.

C. Provide the watering and rolling required to obtain a minimum field density of 95 percent of maximum dry density as determined by AASHTO T99. No separate compensation is made for rolling and watering the base course other than the base course bid item or items listed on the contract documents.

3.4 SURFACE TOLERANCES

A. The base course surface when finished and tested with a 10-foot (3.0 meter) straight edge placed on the surface with its center line parallel to the center line of the street, will not have a surface deviation from the straight edge exceeding 3/8-inch (1.0 centimeter). Additionally, the finished grade cannot deviate more than 0.05 feet (1.5 centimeters) at any point from the staked elevation, and further, the sum of the deviations from two points not more than 30 feet (9.0 meters) apart cannot exceed 0.05 feet (1.5 centimeters).

B. For base course receiving asphalt concrete surfacing, the finished grade cannot deviate more than 0.02 feet (0.6 centimeters) at any point from the staked elevations, and the sum of the deviations from two points not more than 30 feet (9.0 meters) apart cannot exceed 0.02 feet (0.6 centimeters).

C. If patching of the base course is necessary to meet the tolerances, perform patching using methods and aggregates approved by the Engineer. Payment for patching aggregate is at the unit price bid for the base course material.

PART 4: MEASUREMENT AND PAYMENT

4. 1 CUBIC YARD BASIS: CRUSHED BASE COURSE.

A. This item is measured and paid for by the cubic yards (cubic meters) of crushed base course of the gradations specified in the Contract documents, complete in place, at the contract unit price bid for _____"Minus Crushed Base Course". Price and payment is full compensation for furnishing, crushing, loading, hauling, spreading, shaping, watering and compacting the base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. ____" Minus Crushed Base Course - per cubic yard (cubic meters).

4. 2 SQUARE YARD BASIS: CRUSHED BASE COURSE.

A. This item is measured and paid for by the square yards (square meters) of crushed base course surface area for furnishing crushed base course of the thickness and gradations specified in the Contract documents, complete in place, at the contract unit price bid for____" Thickness of ____" Minus Crushed Base Course". Price and payment is full compensation for furnishing, crushing, loading, hauling, spreading, shaping, watering and compacting the base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. ____" Thickness of ____" Minus Crushed Base Course - per square yard (square meter).

4.3 LINEAR FOOT BASIS: CRUSHED BASE COURSE.

A. This item is measured and paid for by the linear feet (linear meters) of trench restored, measured along the trench centerline, with crushed base course of the gradations specified in the Contract documents, completed in place, at the contract unit price bid for_____" Minus Crushed Base Course". Price and payment is full compensation for furnishing, crushing, loading, hauling, spreading, shaping, blending, watering and compacting the base course material, and for all tools, labor and incidentals necessary to complete this item.

B. Payment is made under:

1. _____" Minus Crushed Base Course - per linear foot (linear meter).

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Special Provisions apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Ditch Excavation.
   2. Spillway Excavation.
   3. Drainage Berm Construction.
   4. Incidental excavation and backfill for installation of new culverts under roads.

B. Related Sections include the following:
   1. Division 1 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
   2. Division 2 Section "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
   3. Division 2 Section 02221 "Trench Excavation and Backfill for Piplines & Appurtenant Structures.
   4. Division 2 Section 02230 "Street Excavation, Backfill and Compaction"

1.3 DEFINITIONS

A. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

B. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
   1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Section 01275 "Measurement and Payment or Contract provisions for changes in the Work.
   2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

C. Fill: Soil materials used to raise existing grades.

D. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 1 cubic yard or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.

E. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

F. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

G. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

B. When, in the opinion of the Engineer, the field soil conditions differ from those represented by the material test reports, new samples shall be taken by the Contractor and delivered to the testing agency for classification and laboratory compaction curve testing. All testing shall be based on the appropriate soil test results.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
   1. Notify Engineer not less than two weeks in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Engineer's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm)] in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

D. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

F. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 3/4-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

G. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

H. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations.

D. Provide protective insulating materials to protect subgrade soils against freezing temperatures or frost.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. If required, install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized regardless of the character of surface and subsurface conditions encountered.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
   2. If rock is encountered within excavations, cease work in the area where rock is discovered until a time and materials change order for the extra work can be agreed upon by the Contractor, Owner and Engineer. The work in the affected area will again proceed after a change order is processed, and no shutdown time or associated additional costs will be awarded other than those agreed upon in the change order.

3.5 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing.
   2. Surveying locations of underground utilities for Record Documents.
   3. Removing trash and debris.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.9 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.10 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm)] in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

B. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus [1 inch (25 mm)]

3.13 FIELD QUALITY CONTROL

A. Testing agency will test compaction of soils in place according to the Special Provisions.

B. When testing reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

END OF SECTION

SECTION 02345

GEOTEXTILE FABRICS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section covers the materials, methods of installation, and methods of construction to be used for geotextile fabrics.

B. The work shall include the following:
   1. Furnishing and installing fabric as material under rip-rap and for road stabilization as shown on plans.

PART 2 - MATERIALS

2.1 FILTER FABRIC

A. The fabrics shall be non-woven polypropylene filter fabric. The fabric shall be inert to commonly encountered chemicals and soils and shall remain stable over a temperature range of -50°F to 150°F and at a pH range of 2 to 13.

Required Properties for Fabric

	Fabric Property	Test Method	Value
A.	Mass/Unit Area	ASTM D-5261	8.0oz/yd^2
B.	Minimum Grab Tensile Strength (lbs)	ASTM D-4632	205-220
C.	Grab Tensile Elongation (%)	ASTM D-4632	50
D.	Puncture (lb)	ASTM D-6241	120
E.	Maximum Apparent Opening Size (U.S. sieve number)	ASTM D-4751	80

2.2 ACCEPTANCE REQUIREMENTS

A. Thirty days prior to installation of the proposed fabric, the Contractor shall submit to the Engineer two copies of a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the fabric. The mill certificate or affidavit shall attest that the fabric meets the chemical, physical, and manufacturing requirements stated in this Specification. Also, at least 30 days prior to the use of any fabric, a sample of two square yards of the fabric shall be submitted to the Engineer for approval. The sample shall be labeled with the lot and batch number, date of sampling, project number, specifications, manufacturer, and product name.

2.3 SHIPMENT AND STORAGE

A. During all periods of shipment and storage, the fabric shall be protected from direct sunlight, ultraviolet rays, temperature greater than 140° F, mud, dirt, dust, and debris. To the extent possible, the fabric shall be maintained wrapped in a heavy-duty protective covering.

PART 3 - CONSTRUCTION METHODS

3.1 INSTALLATION OF FABRIC

A. The fabric shall be placed in the manner shown on the Plans or indicated in the General Requirements.

B. The fabric shall be installed by hand or machine methods as recommended by the manufacturer and as subgrade conditions permit. Laps shall be made by overlapping the fabric a minimum of twenty-four inches or by sewing the fabric together in a manner recommended by the manufacturer.

C. Any rocks, debris or other matter that causes localized stresses in the fabric shall be removed and any holes, tears, or cuts in the fabric shall be repaired by placing a fabric patch over the ruptured area which extends a minimum of three feet in any direction from any part of the rupture, prior to placing backfill.

D. At the time of installation, the fabric will be rejected if it has defects, seams or weakness, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation or storage.

E. Once the fabric has been installed, no vehicles or equipment shall be permitted on the fabric.

END OF SECTION

SECTION 02378

RIPRAP

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing and placing riprap rock for drainage structures and erosion control.

PART 2 - PRODUCTS

2.1 RIPRAP

A. Furnish riprap as indicated on the Drawings and according to the following table.

Class	Percent of Rock by Mass	Mass (pounds)	Approximate Cubic Dimension (inches)
6" Nominal	20	22 to 33	6 to 8
	30	11 to 22	5 to 6
	40	1 to 11	2 to 5
	10 (1)	0 to 1	0 to 2

B. Furnish hard, durable, rounded rock for the valley gutters in roadways, which is resistant to weathering and water action and free of organic or other unsuitable material. For all other areas to utilize riprap, fractured stone is acceptable. Do not use shale, rock with shale seams, or porous rock that may break into smaller pieces in the process of handling and placing. In no instance will concrete or other debris rock be allowed.

C. Furnish riprap free of overburden, spoil, sand, dust, organic materials, excessive cracks, mineral lenses and intrusions, or other impurities.

D. Riprap material must have a minimum specific gravity of 2.5. Assure the greatest dimension of each stone is no larger than 3 times the smallest dimension.

E. The stone will be accepted on a visual basis by the Engineer. Submit a sample for approval before placing riprap. If the stone is of questionable origin, the Engineer may require a sodium sulfate soundness test to determine its durability.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

A. Cut, fill, compact, and grade the subgrade surfaces to the lines and grades as shown on the Drawings prior to placing riprap, filter aggregate, bedding, or geotextiles.

B. Prepare subgrade surfaces to be reasonably smooth and free of mounds, dips, or windrows.

C. Install geotextile, conforming to MPWSS Section 02110, to maintain separation of rock material from underlying soil. Place geotextile so that it conforms closely to the subgrade but is not stretched tight. Secure filter fabric by using anchor trenches, stakes, staples, sewing, or any other means necessary according to manufacturer's recommendations.

3.2 PLACING RIPRAP

A. Place riprap to its full thickness in one operation to avoid displacing the underlying material. Do not place riprap material by methods that cause segregation or damage to the prepared surface. Place or rearrange individual rocks by mechanical or hand methods to obtain a dense uniform blanket with a reasonably smooth surface.

PART 4 - MEASUREMENT AND PAYMENT

4.1 GENERAL

A. See Section 01275: Measurement and Payment.

END OF SECTION

SECTION 02725

DRAINAGE CULVERTS

PART 1: GENERAL

1.1 DESCRIPTION

A. Furnish and install all drainage culverts and other appurtenant structures as specified in the Contract and this section. Pipe strength classifications are specified on the plans, listed in the Contract Documents or herein.

1.2 CERTIFICATION BY MANUFACTURER

A. Furnish a manufacturer's certification on all pipe, certifying that the pipe and fittings meet the contract requirements.

1.3 REFERENCES

AASHTO M 36	Corrugated Galvanized Steel Pipe and Pipe Arches
AASHTO M218	Galvanized Steel Coil
AASHTO M245	Pre-Coated Galvanized, Corrugated Steel Pipe and Pipe Arches
AASHTO M274	Type II Aluminized Corrugated Steel Pipe and Pipe Arches
AASHTO M294	Corrugated Polyethylene Pipe (HDPE)
ASTM D361	Low Head Pressure RCP
ASTM C76	Reinforced Concrete Pipe
ASTM C443	O-ring Rubber Gaskets
ASTM C506	RCP - Arch Pipe
ASTM C507	RCP - Elliptical Pipe
ASTM C655	RCP - Tongue & Groove Pipe
ASTM C665	RCP – D-Load Pipe
ASTM A761	Corrugated Steel Structural Plate
ASTM C789	Precast Reinforced Concrete Box Sections
ASTM C850	Precast Reinforced Concrete Box Sections

PART 2: PRODUCTS

2.1 GENERAL

A. Furnish all culvert piping as specified in the Contract Documents and meeting the materials and testing requirements of this Section. Furnish the pipe sizes and strength classifications shown in the Contract documents.

B. References to ASTM, ANSI or AASHTO designation, means the latest revision at the time of call for bids.

C. Assure all pipe is clearly marked with type, class and/or thickness as applicable. Assure lettering is legible and permanent under normal handling and storage conditions.

D. Furnish the joint type, class, thickness designation, casting, lining, marking, testing, etc. as specified.

E. Culverts: Culverts shall be defined as open ended pipes in inlet or outlet control. If plastic pipe is used in Culvert applications, concrete headwalls or prefabricated metal end sections shall be used to protect the pipe ends from Ultraviolet Radiation. All culverts larger than 15-inch diameter shall have and treatments conforming to the embankment side slopes such as flared end terminal sections (FETS) or road approach culvert end treatment (RACET). The engineer shall determine if cut-off walls and edge protection are necessary to protect the installation from erosion.

2.2 PIPE MATERIALS

A. Concrete Pipe

1. Furnish reinforced concrete culvert pipe meeting ASTM C76, C506, C507 or C655. Use round reinforced pipe having O-ring rubber gasket joints meeting ASTM C443 with the O-ring gasket confined in the pipe tongue groove.

B. Corrugated Metal Pipe

1. Furnish corrugated metal pipe meeting ASTM A 760(AASHTO M36). Connections must be made with minimum coupling band width of 10-1/2". When specified by the Engineer, materials shall meet the following standards:

ASTM A760 (AASHTO M36)	Specifications for Corrugated Steel Pipe, Metallic-coated for Sewers and Drains
ASTM A762 (AASHTO M245)	Specifications for Corrugated steel Pipe, Polymer Pre-coated for Sewers and Drains

ASTM A742 (AASHTO M246)	Specifications for Steel Sheet, Metallic Coated and Polymer Pre-coated for Corrugated Steel Pipe
ASTM A929 (AASHTO M274)	Specifications for Steel Sheet Metallic Coated by the Hot Dip Process for Corrugated Steel Pipe. (Aluminized Type II)

C. An Owner may select other materials as appropriate for applications where an Engineer has reviewed the circumstances and provided specifications for installation. When specified by an Engineer, materials shall meet the following standards. Refer to

1. ASTM A761 Corrugated Steel Structural Plate
   ASTM C 789 Precast Reinforced Concrete Box Sections
   ASTM C 850 Precast Reinforced Concrete Box Sections

2 Furnish HDPE Pipe with a corrugated exterior and a smooth interior waterway. Pipe must be made from virgin polyethylene (PE) compounds with dimensions and markings to conform to AASHTO M252, M294 and MP7. Pipe joints must meet ASTM E-1417 and ASTM D3212 standards for watertight joints.

AASHTO M252	Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Polyethylene Pipe
ASTM D3350	Standard Specification for Polyethylene Pipe and Fittings
ASTM E1417	Liquid Penetration Examination
ASTM D3212	Joints for Sewer Plastic Pipes Using Flexible Elastomeric Seals

PART 3: EXECUTION

3.1 PIPE INSTALLATION

A. Excavation and Backfill

1. Excavate and backfill culverts in accordance with manufacturers specifications and Standard Drawings No. 02725-1 and 02725-2 (MDT).

2. Bedding material and backfill around and over culverts shall be compacted to 95% of maximum laboratory dry density, ASTM D690 for all culverts installed in roadway embankments, unless specified otherwise by Engineer

B. Responsibility for Materials

1. Be responsible for all material furnished. Replace all material found defective in manufacture or damaged in handling after delivery by the manufacturer. This includes furnishing all material and labor required for the replacement of installed material discovered defective before final acceptance of the work or during the guarantee period.

2. Be responsible for the safe storage of material for the work until it has been incorporated in the completed project.

C. Handling of Pipe

1. Deliver and distribute all Contractor furnished pipe. Load and unload pipe, fittings and accessories by lifting with hoists or skidding so as to avoid shock or damage. Do not drop the materials. Do not skid or roll pipe handled on skidways against pipe already on the ground.

2. In distributing the material at the work site, unload each piece opposite or near the place where it is to be laid in the trench. Keep the pipe interior and other accessories free from dirt and foreign matter at all times.

3. Handle pipe to prevent coating or lining damage. Repair or replace all coating or lining damage in a manner satisfactory to the Engineer.

D. Laying Pipe.

1. Lay and maintain all pipe to the specified lines and grades with fittings, at the specified locations.

2. Use tools and equipment meeting Engineer approval for the safe and convenient prosecution of the work. Carefully lower all pipe and fittings into the trench preventing damage to pipe materials and protective coatings and linings. Do not dump or drop materials into the trench.

3. Exercise care to prevent foreign material from entering the pipe as it is installed. When pipe laying is not in progress, close the open ends of pipe using a plug or other means approved by the Engineer. Remove and clean

all sand, gravel, concrete and cement grout that has entered the lines during construction.

E. Tolerances

1. Install pipe within 1/2-inch (13 mm) of the specified alignment and within 1/4-inch (6 mm) of the specified grade for pipe 15-inch (38 cm) in diameter and smaller and 1/2-inch (13 mm) of specified grade for pipe larger than 15-inch (38 cm) diameter. These tolerances apply to any point along the entire pipe length.

3.2 TESTS

A. Visual Inspection

1. Inspect culverts for line, grade and roundness. Repair or replace culverts that are out of round, excessively deflected, or not installed to line and grade requirements.

B. Joints

1. All joints shall be silt tight joints to prevent infiltration and exfiltration of soil and water.

PART 4: MEASUREMENT AND PAYMENT

4.1 GENERAL

A. The following are pay items for the work covered under this section. Payment for these items is full compensation for providing all materials, tools, labor and equipment necessary to complete the item and all incidental work related thereto, whether specifically mentioned herein or not.

4.2 CULVERTS

A. Measurement of culvert piping is by lineal feet (meters) of the various sizes and classes along the centerline of pipe for the length of pipe installed, including flared ends. Payment for culvert piping is made at the contract unit price bid per lineal foot (meters), which includes furnishing and installing pipe, including any specials or flared end sections, trench excavation and backfill, and all other work necessary or incidental for completion of the item.

4.3 GENERAL

A. The contract bid prices are full payment for all labor, materials, tools and other incidentals as maybe required to complete the items of work in the Contract.

END OF SECTION

SECTION 02910

SEEDING

PART 1: GENERAL

1.1 DESCRIPTION

A. This section includes ground surface preparation; furnishing and applying fertilizer; and furnishing and planting seed in areas described in the contract documents or directed by the Engineer.

B. Hydraulic seeding is not included in this section. Hydraulic seeding is covered in Section 02920, Hydraulic Seeding.

1.2 SUBMITTALS

A. Submit to the Engineer applicable seed mixture certifications, fertilizer descriptions and mulch certifications. Furnish duplicate signed copies of the vendors statement certifying that each seed lot has been tested by a recognized seed testing laboratory within 6 months of date of delivery. Assure the statement includes: Name and address of laboratory, date of test, lot number for each seed species and the test results including name, percentages of purity and of germination, percentage of weed content for each kind of seed furnished and, for seed mixes, the proportions of each kind of seed.

PART 2: PRODUCTS

2.1 SEED

A. Furnish seed and seed mixture, free of all prohibited noxious weed seed or any other weed seed prohibited by state or local ordinance.

B. Seal and label all seed containers to comply with Montana Seed Law and Regulations or meeting U.S. Department of Agriculture and Regulations under the Federal Seed Act, if shipped in interstate commerce.

C. Do not use wet, moldy, or otherwise damaged seed in the work.

D. Furnish seed mixture of the species described in the contract documents. Furnish seed in standard containers labeled with the seed name, lot number, net weight,

percentages of purity, germination, hard seed, and percentage of maximum weed seed content for each seed species.

2.2 TOPSOIL

A. Use topsoil that is loose, friable, loamy soil, free of excess acid and alkali. Assure topsoil does not contain objectionable amounts of sod, hard lumps, gravel, sub-soil or other undesirable material that would form a poor seedbed. Before striping topsoil, assure it has supported the growth of healthy crops, grass or other vegetable growth.

2.3 LIME

A. Furnish ground limestone or other material deemed suitable by the Engineer containing a minimum 85 percent of total carbonate equivalent ground so that 90 percent will pass through a No. 100 mesh sieve. Coarser material may be acceptable, if the application rates are increased to provide at least the minimum quantities and depth specified using an approved Dolomitic lime or a high magnesium lime containing at least 10 percent magnesium oxide.

2.4 FERTILIZER

A. Furnish standard commercial fertilizers supplied separately or in mixtures containing the specified percentages of total nitrogen, available phosphoric acid, and water soluble potash. Apply fertilizer at the specified rate and depth meeting the applicable State and Federal laws. Furnish fertilizer in standard containers clearly labeled with name, weight, and guaranteed analysis of contents. No cyanamide compounds of hydrated lime are permitted in mixed fertilizers.

B. Fertilizers may be supplied in one of the following forms:

1. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;

2. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or

3. A granular or pellet form suitable for application by blower equipment.

2.5 SOILS FOR REPAIRS

A. Use soil for filling and topsoiling repair areas of equal quality to the existing topsoil being repaired. Assure the soil is free of large stones, roots, stumps, or other

materials that interfere with sowing, compacting, and establishing turf. Obtain approval from the Engineer before placing topsoil.

PART 3: EXECUTION

3.1 TOPSOIL

A. Place at least 6 inches (15 cm) of topsoil in all areas to be seeded. Import topsoil if sufficient topsoil is not available from excavated areas of the project.

3.2 ALLOWABLE SEEDING MONTHS

A. Perform seeding when the temperature and moisture are favorable to germination and plant growth. Seed preferably before June 1st and after October 1st of each year. Seeding dates must be approved by the Engineer.

3.3 SEEDBED PREPARATION AND SOWING

A. Clear the areas to be seeded of all debris, vegetation, and other material determined by the Engineer to be detrimental to the preparation of a seedbed. Once the area is cleared, disc, harrow, rake, or work the area by other suitable methods, into a smooth, even seedbed. Assure the prepared seedbed surface is firm enough to prevent seed loss from high winds or normal rainfall. If rolling is required, perform rolling before seeding using a suitable roller, of a weight appropriate to the soil conditions.

B. Sow seed in the areas described in the contract documents at the specified application rates.

C. Sow seed using a force feed drill having a grass seed attachment, except of slopes steeper than three to one or on areas too small to be seeded with a force feed drill. In these areas, seed may be sown by power sprayers, blowers or other effective methods. Use equipment in good working order.

D. Seed Kentucky Bluegrass at a depth of one-quarter inch or less and cultipack the seed.

E. Do not sow seed in winds that prevent proper imbedment into the surface.

3.4 FERTILIZER

A. Spread and work fertilizer into the soil during the final seedbed preparation. Apply fertilizer at the rate described in the contract documents.

3.5 CARE OF SEEDED AREAS

A. Keep the seeded area moist until it has germinated and it's continued growth is assured. Prevent erosion during watering. Water is incidental to the item "Seeding".

B. Protect all seeded areas from traffic or pedestrian use with warning barricades or other Engineer approved methods.

C. Maintain the seeded area, performing any required watering and mowing until the seed is firmly established. Prevent weeds and other undesirable vegetation from establishing in the seeded area. Mow weeds and rake and remove the clippings from the areas.

D. Replace any seeded areas failing to germinate which have died or been damaged by construction activities. Replace such areas to meet the contract requirements. The contract warranty period applies to this item.

PART 4: MEASUREMENT AND PAYMENT

4. 1 GENERAL

A. Seeding is measured by the square yard (square meter) and paid for at the unit price bid including topsoil salvage and/or importing, topsoil placement, seedbed preparation, and seeding, complete in place and accepted by the Engineer.

B. Payment indicated to include complete compensation for all labor, equipment, materials and incidentals required for the completion of the work.

END OF SECTION